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Agricultural Policy in India: Growth with Equity

J.S. Sarma

Résumé

Aujourd'hui, l'attention se porte de plus en plus sur la réalisation d'un équilibre entre augmentation de la production agricole et justice sociale en milieu rural. Les faits montrent que beaucoup de programmes de développement du Tiers-Monde ont surtout profité aux régions plus florissantes et, tout particulièrement, aux couches les plus prospères de la communauté agricole de ces régions. Étant donné l'importance de vraiment s'attaquer au problème de la pauvreté dans les pays à faible revenu, il s'impose d'explorer les moyens de répartir plus équitablement les bienfaits du développement.

L'Inde est l'une des grandes démocraties des pays en développement, et, depuis son indépendance, sa politique et sa stratégie de développement agricole ont constamment évolué, en ce sens que les objectifs et les mesures et les moyens d'atteindre ces objectifs ont souvent changé. Il existe beaucoup de documents (statistiques, documents officiels, études indépendantes, évaluations, etc.) sur l'expérience de l'Inde. La présente monographie passe en revue tous ces documents et propose une stratégie agricole déterminée par le partage équitable de l'accroissement des rendements.

Resumen

Se está prestando actualmente una gran atención en agricultura al equilibrio entre crecimiento y equidad. La experiencia ha demostrado que los frutos de numerosos programas de desarrollo en los países del Tercer Mundo se han acumulado desproporcionadamente en las regiones más prósperas y, dentro de estas regiones, en los sectores más prósperos de la comunidad agrícola. Teniendo en cuenta la importancia de realizar un gran impacto sobre el vasto problema de la pobreza en los países de bajos ingresos, resulta imperativo explorar los medios que permitan una participación más equitativa en los beneficios del desarrollo.

Entre los países en desarrollo, la India constituye una de las más grandes democracias donde, desde la Independencia, las políticas y estrategias de desarrollo agrícola han estado evolucionando continuamente, experimentando varios giros tanto en los objetivos y las medidas relativas a políticas, como en los instrumentos adoptados para alcanzar los fines perseguidos. Existe una gran cantidad de información (datos estadísticos, documentos oficiales, estudios de investigación independientes, informes de evaluación, etc.) que refleja la experiencia hindú. La presente monografía tiene por objeto pasar revista a la información disponible y sugerir una estrategia agrícola con miras a lograr el crecimiento junto a la equidad.

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Foreword

One of the great natural resources of developing countries is found in senior public servants, administrators, and researchers who devote their talents to developing and implementing policies designed to lead to growth and equity for their fellow citizens.

These policies must be shaped and implemented by weighing conflicting advice and pressures that are both internal and external in nature and origin. The process of policy formulation and implementation demands a high degree of talent and energy that leaves little or no time for reflection and evaluation.

The Senior Research Fellowships of IDRC have enabled us to offer to these individuals the unusual opportunity of stepping aside for a period of study and review the process through which they have passed, and to comment upon the results of their efforts. The benefit for us all is that the perspective used is not one of detachment but of involvement. The resultant study is a personal assessment and statement by that individual of the period and policies under study.

A great deal of attention is now being focused on the problem of the trade-off in agriculture between growth and equity. Experience has shown that the fruits of many development programs in Third World countries have disproportionately accrued to the more prosperous regions, and within those regions to the more prosperous segments of the agricultural community. In view of the overriding importance of making a sizeable dent in the vast problem of poverty in the low-income countries, it is important to explore the ways in which the benefits of development can be shared more equitably.

Among developing countries, India is one of the largest democracies where, since Independence, agricultural development policies and strategies have continuously evolved, undergoing several shifts in terms of their objectives, policy measures, and instruments adopted to achieve the objectives. Therefore, it is very instructive and worthwhile to analyze the Indian experience in dealing with the conflicts between growth and equity in agricultural development. Fortunately, a large amount of information (statistical data, official documents, independent research studies, evaluation reports, etc.) is available reflecting the Indian experience.

I. S. Sarma has had a long and distinguished career in the Ministry of Agriculture of India. He has served in various capacities including Economic and Statistical Adviser and Member Secretary, National Commission on Agriculture. In reviewing the past agricultural policies, Sarma has relied extensively on the knowledge and experience gained from over 30 years of work in the Ministry of Agriculture.

The 2 years of this fellowship were spent at the International Food Policy Research Institute (IFPRI) in Washington and we express our appreciation to John Mellor for the ease of the relationship; a shorter and modified version of this monograph has been published by IFPRI in its Research Report series (number 28, November 1981).

Sarma has been an exciting Fellow with whom to be associated and the results of his study will be of great interest to all who share our common concerns for growth and equity in agricultural policy.

J. Allan Rix
Associate Director
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Summary

During the early phase of British rule in India, the undefined agricultural policy had a colonial bias, i.e., exporting food and raw materials to feed the colonial power and its industry. Although some measures were taken to relieve distress in rural areas, particularly after a famine, there was no welfare orientation as such. Following the recommendations of the Royal Commission on Agriculture in 1928, some steps were taken to promote agricultural research and education, but action on several equally important recommendations was not taken due to financial constraints following the Great Depression. The government's intervention in and assistance to agriculture became much more direct and production-oriented during World War II, with the launching of the grow-more-food campaign in 1943.

Since Independence, achieving social justice has continued to be a policy goal under the successive five-year plans. A number of steps were taken, such as land reforms to eliminate exploitation of peasants and provide security for tenants, encouraging cooperative credit and marketing, and the establishment of community development and panchayati raj agencies, to promote rural welfare and participation by the people in development activities. However, the strategy adopted for agricultural production at different stages was in response to the urgent needs for growth perceived at the time. At the end of the Second Plan, when a food crisis threatened, efforts were concentrated on those areas most conducive to rapid growth, particularly under the intensive agricultural programs. In 1965 and 1966, a crisis occurred as a result of the most severe droughts of the century. The country faced mounting food deficits that could be met only through large imports from abroad. Achieving self-sufficiency in food grains became the immediate concern of agricultural policy under the new strategy for agricultural production based on high yielding varieties initiated in 1966/1967.

The success achieved under the new strategy in Punjab, Haryana, and Western Uttar Pradesh, with regard to wheat (as well as the possibility for similar success with other cereals), was so impressive that by 1970/1971 food self-sufficiency was thought to be just around the corner. On the basis of field observations and evaluation studies, however, it was feared that the new strategy, with its inherent reliance upon capital-intensive irrigation and chemical inputs, might lead to a widening of interpersonal and interregional disparities. To counteract this, special programs were initiated, toward the end of the Fourth Five-Year Plan under the policy of growth with social justice, to assist small and marginal farmers, agricultural labourers, and the inhabitants of drought-affected areas in increasing their production, employment, and income.

During the early 1970s, in part due to a slow down in fertilizer consumption and irrigation and partly due to adverse weather conditions, growth in food-grain production stagnated and food imports began to increase again. The situation began to improve in 1975/1976, with self-sufficiency being attained soon

thereafter, even though the overall annual rate of growth of food grains was a modest 2.8% between 1967/1968 and 1978/1979. Rural unemployment and poverty persisted, with nearly half of the rural population being below the poverty line. Obviously, the equity programs superimposed on the new strategy for agricultural production did not have any visible impact on the rural economy.

Under the revised draft of the Sixth Five-Year Plan (1978–1983), the ongoing programs were reviewed, and the irrigation and fertilizer programs were accelerated to ensure higher and sustained rates of growth. A number of policy measures were devised, including a multiagency approach to credit, increased emphasis on agricultural research, a reorganized extension system, and integrated rural development programs, to improve the employment opportunities and incomes of the weaker sections of the population. The food-for-work program was expanded and increased emphasis was placed on small-scale and cottage industries.

A detailed analysis of the impact of new technology on growth has shown that, apart from the fact that the overall rate of growth has been modest, it has not been uniform over time, among different crops, or in different regions. The new technology, based on high-yielding varieties, did contribute to growth in production and productivity, although this growth was largely confined to wheat in irrigated areas and, as such, its impact was not reflected in the overall growth rate. With the increased emphasis given to irrigation and fertilizer programs under the draft Sixth Plan, the proposed higher growth rates are feasible.

With regard to interpersonal and interregional disparities, it is evident that, where land distribution remains skewed, a technology that raises the output per unit of land will result in widening the disparities in the absolute incomes of families living on the land. Similarly, a technology that is suited to irrigated and assured-rainfall areas will also result in widening interregional disparities. The relevant issues are whether or not the new technology can be adopted by the small and marginal farmers and whether or not they have, in fact, participated in and benefited from it. Available evidence indicates that, although these farmers were somewhat late in adopting the new technology, many of them did participate in it, particularly in those areas where adoption of the technology was rapid. Furthermore, although the share of institutional credit advanced to small farmers is larger in relation to the low overall percentage of land held by them, it still falls short of their requirements. The widespread participation of small farmers could be facilitated by providing them with preferential access to inputs and credit and removing other constraints.

The special programs designed to enable small farmers to participate in the new technology did not have any measurable impact because of their inadequate coverage, ineffective implementation, absence of a "package" approach to the various facilities needed, and lack of integration between crop production and subsidiary-activity programs. Wherever the programs were properly implemented, however, the essential concept of the small farmers' development agencies (SFDA) scheme, that small households can be relieved of poverty, was validated if production assets were delivered to these households as a package and their new activities were linked with support systems.

It is true that interregional disparities have been widened by the adoption of new technology based on high-yielding varieties of crops. It is also true that interregional disparities can never be eliminated, in the sense that the natural endowments of different areas can never be made equal. Existing disparities could be reduced, however, if a technology suitable to dry areas could be

evolved. Additional measures could also be taken to improve the yields per hectare and increase the incomes of the people living in these areas.

Given the twin objectives of growth and equity, various options are available, in terms of policy instruments and measures, to attain these objectives. Some of the policy options, however, may have implications for growth and equity that are partly or wholly in conflict and that need to be reconciled before a consistent set of agricultural policies is formulated. When considering these conflicts, one has to keep in mind two related dimensions of equity: first, a substantial reduction in the gap between the income levels of the rich and the poor and, second, improvement in the income levels of the poor so that they can have a reasonable standard of living. Because the new technology is neutral to scale, it is possible to raise the incomes, from crop production, of small and marginal farmers through provision of preferred access to credit, inputs, and marketing and extension services. For marginal farmers and landless labourers, subsidiary activities and rural industries need to be developed to supplement income from crop production and wages respectively. In this sense, there need not be a conflict between growth and equity. The production strategies implemented in the 1960s resulted in widening the disparities between different classes of farmers. Yet, in retrospect, given the severity of the food crisis that led to the adoption of the new strategy in the mid-1960s, a policy of concentrating efforts in favourable areas seems to be justified. Because the immediate objective of achieving self-sufficiency in food grains has been achieved, the adoption of a growth strategy for the small farmer is now called for and is, in fact, one of the essential elements required to realize the welfare objectives of the five-year plans.

The approaches adopted for economic development in developing countries included: emphasis on rapid growth, with the expectation that the benefits would trickle down to the poor; growth with redistribution, implying the redistribution of the increments of growth to the poor; and the basic needs approach, involving a major redistribution of the total income and stock of productive assets. Each of these approaches has been tried in India, at different times, with limited success. A composite strategy can be drawn up, however, based on the development experience in Indian agriculture, which if properly implemented could lead to the achievement of the twin objectives of growth and equity.

The new technology, based on high-yielding varieties, is applicable to irrigated and assured-rainfall areas. Because productivity per hectare, income, and employment are different between irrigated and nonirrigated areas, a separate strategy for agricultural production has to be considered for each of these areas. Similarly, the resource endowments, potential for development, and problems to be encountered in realizing the potential differ among marginal, small, and large farms in irrigated and dry areas; hence, a different strategy has to be adopted for the development of each of these classes. Furthermore, because crop production alone cannot provide sufficient employment and income for marginal farmers and some small farmers, subsidiary activities allied to agriculture, such as animal husbandry, dairy farming, poultry farming, pig farming, and fisheries, have to be provided to improve their standard of living.

The composite strategy proposed for achieving agricultural development and growth with equity has six components: (1) Where the potential for irrigation exists, its development should be accelerated and small and marginal farmers should be given preference; states and areas where there is little irrigation should also be given higher priority in terms of irrigation development. (2) Small and marginal farmers who have irrigation facilities should receive assistance to en-

able them to adopt the new technology through the provision of inputs, credit, extension, and other facilities. (3) A 10-year program for the improvement of crop yields in dry areas should be drawn up; simultaneously, research in dryland agriculture should be intensified with a view toward evolving appropriate technology. (4) Marginal farmers with irrigation facilities, small and marginal farmers in dry areas, and landless workers should be provided with subsidiary occupations to supplement their incomes. (5) Even with agricultural development, there may still exist a number of unemployed and underemployed persons in the rural work force; therefore, nonfarm employment in cottage and small industries should be promoted in rural areas. (6) Rural public works programs, the food-for-work program, or guaranteed employment schemes should be organized on a massive scale on a decentralized basis to alleviate the immediate problem of rural unemployment, particularly during drought years and in areas continually plagued by drought.

The implementation of this strategy requires the support of appropriate institutional structure. With regard to the agrarian structure, no radical redistribution of land will solve the problems of inequity associated with the existing land/man ratio in India. However, strict enforcement of "ceilings" legislation and regulation of tenancy are needed. Shared tenancies, where the input costs are shared by the landowners, do not militate against the adoption of new technology. A satisfactory solution has to be found for the cultivation of lands leased out by small and marginal absentee landowners, perhaps in the form of a corporate/cooperative system of management for these lands.

Because agricultural programs are area-based, there are obvious disadvantages in having separate institutions supplying inputs and credit to meet the needs of small and large farmers. Setting up farmers' service societies (FSS) with adequate safeguards to ensure that small farmers receive their requirements in full is one solution that has been suggested by the National Commission on Agriculture. Although there are mixed feelings regarding FSS, the important point is that small farmers need inputs, credit, marketing facilities, and extension as a package, and this should be ensured. A multiagency approach to supplying inputs is favoured but this would require that in each area an appropriate agency be specifically earmarked to provide small farmers with their needs.

With regard to incentives, even though remunerative prices are assured to producers, small farmers often do not receive the benefit of these prices. Appropriate arrangements are required for either opening more purchase centres in rural areas or pooling surpluses and transporting them to purchase centres. Also, functional cooperatives linked to FSS or cooperative credit societies, at the appropriate level, need to be organized to handle processing and marketing of perishable products such as milk, poultry, meat, fruits, and vegetables. Extension services for the dissemination of new techniques to small and marginal farmers have to be organized on a "group" basis and the "training and visit" system of extension needs to be oriented toward the small and marginal farmers. In agricultural research, higher priority should be given, in terms of financial allocations and organizational support, to research on improving crop yields in dry areas and in areas with poor soil conditions, and on crops grown and consumed by the poor. Greater efforts are needed at both the micro- and macrolevels of research on socioeconomic aspects.

In terms of broad policy, these proposals do not differ from the macrolevel policy enunciated in the draft Sixth Five-Year Plan, although they differ in detail and emphasis. The main difficulty has been in translating these policies into operational plans and implementing them. Also, because agricultural planning

is conducted predominantly at the state and all-India levels, problems at the local level are not properly thought out and provided for during the plan-formulation stage. To ensure better implementation of policies and programs, reorganization of planning techniques and machinery is suggested. It is important that decentralized planning, which has been under discussion since the Second Five-Year Plan, be implemented without further delay to replace the top-to-bottom approach that is presently being followed. Agricultural schemes and programs should be formulated at lower levels, wherever such programs are amenable to local-level planning, and then aggregated at the district and state levels. In working out the operational details of policies and programs at the local level (particularly those dealing with irrigation and fertilizer), the equity objective should be kept in view. One should examine the difficulties faced by the weaker sections of the population in participating in the programs and deriving benefits from them, and steps to overcome these difficulties should be taken. For this purpose, there should be planning teams at the district level, with the chief agricultural development officer, as recommended by the National Commission on Agriculture. Also, it is necessary to initiate land-use planning to achieve not only rapid growth but also balanced regional development. Land-use and crop planning should be introduced as an essential element of decentralized planning.

Arrangements for implementing policies and programs at the local level need to be streamlined. The field organization of state agricultural departments should be reorganized into agricultural development departments with the chief agricultural development officer and block agricultural development officer heading the district and block levels respectively. These individuals should be made accountable for achieving results and the requisite authority given to them. Arrangements should be made for systematic monitoring and evaluation of programs, with the monitoring and evaluation units at the district level being placed under the chief agricultural development officer. Other measures to improve performance include revision of financial rules for sanctioning schemes, decentralization of power, delegation of authority, and review of the service regulations regarding rewards and punishments.

Local participation in the formulation and implementation of agricultural programs will improve performance. For this purpose, farmers' organizations that represent the interests of small and marginal farmers and landless labourers need to be developed. Responsibility should be taken by the government for safeguarding the interests of the rural poor and ensuring that they participate in and derive benefits from these programs.

The twin problems of rural poverty and unemployment are massive, but a substantial amelioration can be expected over the next 10-15 years through the adoption of strategies that allow for growth and equity to be achieved simultaneously within the agricultural sector. If well-formulated and feasible projects are available, financial resources need not be a constraint. It should be possible to supplement internal resources with assistance from international agencies. Also, given India's experienced administrative setup, reservoir of educated manpower, and many educational institutions, organizational constraints can be overcome. The country has already gained considerable experience in the implementation of equity-oriented programs. The political will and commitment to social justice has to percolate to the block and village levels. Any continued neglect of the rural poor, leading to further deterioration of their living conditions, will lead to rural tensions, class conflicts, and violence. The requisite strategies are available and need to be implemented through timely and effective action by the government.

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1. Introduction

Agriculture plays a dominant role in the Indian economy, although its contribution to the net domestic product (at 1970/1971 prices) dropped from 59% at the beginning of the 1950s to 41% at the end of the 1970s (Table 1.1). Between 1951 and 1981, the population increased at rates varying between 2 and 2.2%/year (compound), whereas the proportion of rural dwellers to total population declined marginally (Table 1.2). The labour force in agriculture remained at about three-quarters of the total labour force, with the result that the income per agricultural worker, which was about one-half that of a nonagricultural worker in the early 1950s, was reduced to less than one-fourth that received by a non-agricultural worker toward the end of the 1970s.

India ranks 15th from the bottom, among developing countries, on the basis of per capita income, which is around U.S. $180 (World Bank 1980). The man:land ratio is high at 4/ha of arable land. Both the productivity of land, at nearly 1 t of food grains per hectare, and fertilizer use, at 26 kg fertilizer/ha of cropped land, are low compared with many developed countries. Furthermore, only one-quarter of the area under food grains is irrigated, with yield levels that are 2–2.5 times higher than those in the rain-fed areas.

Table 1.1. Net domestic product (NDP) at factor cost and share of agriculture at 1970/1971 prices, all India.

Year	Net domestic product (Rs × 10^9)	Share of agriculture (Rs × 10^9)	Agricultural share as a percentage of NDP
1949/1950	168.11	99.28	59.06
1950/1951	167.98	98.59	58.69
1960/1961	243.60	131.43	53.95
1970/1971	345.19	163.54	47.37
1978/1979	467.13	192.44	41.20

Source: Central Statistical Organization, Government of India. National accounts statistics, 1970/1971 to 1976/1977 and 1970/1971 to 1978/1979. January 1979 and 1981 respectively.

Table 1.2. Total population, percentage rural population, and labour force in agriculture, all India.

Year	Total population ($\times 10^6$)	Rate of growth (percentage per annum, compounded)	Percentage rural population	Labour force in agriculture as percentage of total labour force
1951	361.1		82.7	72.8
1961	439.2	2.0	82.0	73.0
1971	548.2	2.2	80.1	73.8
1981	683.8[a]	2.2	76.3[a]	NA

Sources: Ministry of Agriculture and Irrigation (1978a); Planning Commission (1979a, p. 156).
NOTE: NA = not available.
[a]Based on Government of India press release.

Until recently, India was heavily deficit in food grains, having had to import 120×10^6 t of cereals during the 30 years after Independence (Sarma 1978). By 1977/1978, however, largely due to significant increases in domestic production and procurement of wheat and rice, the country became self-sufficient.[1] Even during a climatically adverse year such as 1979/1980, when domestic production fell by nearly 18% compared with that of 1978/1979, India managed without net imports from abroad by drawing upon domestic grain stocks held by the government. Yet, in terms of per capita availability, the average annual food grain consumption between 1975 and 1977, at 158.9 kg, was lower than that between 1970 and 1972 (169.4 kg) or 1960 and 1962 (168.0 kg) (Table 1.3).

Moreover, in 1977/1978, nearly half of the population was estimated to be below the poverty line, having an income too low to provide themselves with the recommended nutritional requirement of 2400 cal/person/day in rural areas and 2100 cal/person/day in urban areas. Furthermore, of an estimated labour force of 272.8 million, in 1978, about 4.4 million were chronically unemployed, and the current unemployment would be equivalent to 19.5 million person-years, using the criterion adopted by the national sample survey (Planning Commission 1979a).

Politically, India is a large democracy, a socialistic republic, which adopted economic development planning soon after attaining Independence. Although self-sufficiency in food grains was achieved, the large number of people below the poverty line indicates that the social justice or welfare objectives of the five-year plans have not yet been fulfilled. This raises questions about the validity of existing policies and strategies for agricultural development and the compatibility of growth and equity.

This monograph attempts to review agricultural policies as they have evolved in India, assess their impact on the economy, examine the conflicts between growth and equity in the agricultural sector, discuss methods of reconciling or minimizing conflicts, and suggest possible outlines of policies and strategies that could be adopted to achieve growth with equity. Chapter 2 provides a brief review of past policies and their evolution. Chapters 3 and 4 deal with the impact of new technology and special programs on growth and equity. Growth in agricultural production, with particular reference to food grains, is examined both before and after the so-called "green revolution" in Chapter 3. Inequity in agriculture is either interfarm or interregional; these disparities are considered in Chapter 4. Conflicts between growth and equity policies are discussed in Chap-

Table 1.3. Per capita availability of food grains based on food balance sheets.

Triennium	Cereals (kg/year)	Growth rate (%)	Pulses (kg/year)	Growth rate (%)	Food grains (kg/year)	Growth rate (%)
1950–1952	124.6		22.8		147.4	
1960–1962	144.0	1.46	24.0	0.51	168.0	1.32
1970–1972	151.1	0.48	18.3	−2.67	169.4	0.08
1975–1977	142.5	−1.16	16.4	−2.17	158.9	−1.27

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. Bulletin on Food Statistics, various issues.

[1] The concept of self-sufficiency adopted here implies that the requirements for supplying food grains through the public distribution system could be met from within the country from domestic production and/or carry-over stocks, without importing from abroad.

ter 5. In the light of this analysis, a policy framework, outlining the main features of the proposed agricultural strategy, is suggested in Chapter 6. Discussed in Chapter 7 are the institutional reforms covering both the agrarian structure and institutional development needed for the success of the strategy; whereas Chapter 8 deals with the reorganization of the planning and implementation procedures required. Some concluding observations, with regard to the feasibility of the approach, are presented in Chapter 9.

2. Agricultural Policy: A Brief Review

Preplanning Period

During the early phase of British rule in India, there was no state policy for improving the utilization of natural agricultural resources or any form of welfare orientation. "The unspelt out agricultural policy in the beginning of the century had a colonial bias, exporting food and raw materials to feed the colonial power and its industry" (Sarma 1974). Even the irrigation schemes implemented in the deltas of major rivers were motivated mainly by revenue considerations.[1] Introduction of land tenures and settlements, which were also revenue-oriented, resulted in rack renting, exploitation of tenants, and depriving the ryots of their land. This is not to say that there were no positive changes. Indeed, the restructuring of land relations and availability of irrigation led to an expansion of the area under cultivation; after a famine, some attempts were usually made to provide irrigation facilities in scarcity-affected areas; debt relief measures for agriculturists were undertaken; and the idea of cooperative institutions, with particular emphasis on credit, was introduced. Loans were given to cultivators for agricultural improvement. In general, however, neither the imperial government nor the provincial governments had any positive policy for developing the agricultural sector or attaining social justice, e.g., very little was done to support agricultural prices during the Great Depression.

Following the recommendations of the Royal Commission on Agriculture (1928), some steps were taken to promote agricultural research, education, and marketing, but action on several equally important recommendations was not taken due to constraints on financial resources following the Great Depression.[2]

After Japan's entry into World War II, the food strategy of the Government of India was upset by the fall of Burma and the consequent loss of rice imports from Burma. The government's intervention in and assistance to agricultural production, particularly food grain production, became much more direct with the launching of the grow-more-food (GMF) campaign in 1943. The central government provided loans and grants to provincial governments to undertake schemes for increasing food grain production. During the early phase of the GMF campaign, no production targets were set. The types of measures undertaken included diversion from production of cash crops (mainly cotton) to food crops; extension of cultivation to current fallows and cultivatable wastelands through reclamation schemes; and intensive cultivation through increased use of improved seeds, fertilizers, and irrigation.

[1]It is true, however, that present food surplus areas in northwestern and southeastern India are those in which irrigation systems were constructed during the period of British rule.

[2]For a detailed review of the main changes in agricultural policies and the development of an institutional framework, since 1928, refer to National Commission on Agriculture (1976, Part I) and Dantwala (1972).

In January 1946, after the conclusion of World War II and before Partition, the Government of India issued, for the first time, a "statement on agricultural and food policy in India." The overriding goal of the policy was "to lead the country away from the menace of famine to a new vigor and prosperity" (Department of Agriculture 1946). The policy statement took into account reports of policy committees set up by the postwar reconstruction committee of the executive council. The objectives of the policy included: increasing food grain and subsidiary food production, improving agricultural production and marketing methods, stimulating production of raw materials for industry and export, securing remunerative prices for producers and fair wages for agricultural labourers, ensuring fair distribution of the food produced, and promoting national research and education. The statement also defined the responsibilities of the central and provincial governments for carrying out these tasks and outlined the principles to be followed by the central government in providing financial assistance to provincial governments. The implementation of this policy, however, was never realized in the wake of Partition and Independence in August 1947.

As a consequence of Partition, in addition to a food deficit, imbalances between domestic production of and demand for cotton and jute developed. This led to the modification of the GMF campaign to form the integrated production program, in 1950/1951, which included these crops also. The earlier policy of diverting land away from cash crops was reversed.

In March 1950, soon after Independence, the Planning Commission was appointed to formulate a plan for the most effective and balanced utilization of the country's resources, based on an assessment of its material, capital, and human resources; periodically appraise progress achieved; and recommend necessary policies and measures to achieve the objectives.[3]

Five-Year Plans

Agriculture, including irrigation and power, was given top priority in the First Five-Year Plan (1951/1952 to 1955/1956). It was recognized that without a substantial increase in the production of food and raw materials needed for industry it would be impossible to sustain a higher rate of investment. The plan also emphasized diversification of agriculture and the need to make agriculture more efficient. Specific policy statements, regarding the structure of prices and levels of food grain prices, were made in the plan. The land policy was designed to reduce disparities in wealth and income, eliminate exploitation, and provide security for tenants and equality of status and opportunity to different sections of the population (Planning Commission 1953, p. 88). Thus, measures devised under this policy were aimed at securing equity and social justice in rural areas.

The First Plan's approach to agricultural development was based on three assumptions (Mellor 1968, p. 34). Firstly, it was assumed that agriculturists were exploited by the stronger elements of society, i.e., landowners, moneylenders, and traders. Secondly, it was felt that the low agricultural productivity was due to illiteracy and ignorance on the part of the majority of the rural population. Thirdly, it was recognized that agricultural production could be improved by increasing the use of inputs, especially water, although the role of technological

[3]The draft of the First Five-Year Plan was drawn up in July 1951 and finalized in December 1952. The First Five-Year Plan began on 1 April 1951.

change in increasing productivity was not sufficiently realized. To overcome institutional impediments, attention was focused on land reforms[4] and promotion of cooperative credit and marketing. In pursuance of a recommendation of the GMF enquiry committee, the community development (CD) program was launched in October 1952.[5] Increasing agricultural production was one of the objectives of the CD program, and for this reason the national extension service was organized as its principal component. The philosophy underlying the CD movement was that villagers' attitudes toward the use of production-increasing technology needed to be changed and that they should be approached "not through a multiplicity of departmental officials, but through an agent (called the village-level worker) common at least to the principal departments engaged in rural work" (Planning Commission 1953, p. 102). Essentially, within the agricultural sector, the First Plan was merely a continuation of the GMF schemes and the integrated production program.

Agriculture was not specifically included among the development objectives of the Second Five-Year Plan[6] (1956/1957 to 1960/1961). It is likely that, because the targets for food grain production under the First Plan had been achieved, agriculture was not considered to be high priority. Agricultural programs under the Second Plan, therefore, were envisaged merely as a continuation of the programs of the First Plan. What was not realized, however, was that the production targets of the First Plan had been met, by and large, as a result of good weather and an increase in area under food grains.

Regarding land policy, the twofold objectives of land reform were clarified as the removal of impediments to agricultural production that had arisen as a result of the character of the agrarian situation and the creation of conditions for evolving a highly efficient and productive agrarian economy. It was thought that essential steps would be taken during the Second Plan to ensure that, over a period of about 10 years, a substantial portion of agricultural lands would be cultivated along cooperative lines. The beginning of democratic decentralization, through the setting up of Zilla Parishads, was made during the Second Plan, following the recommendations of the Balwantray Mehta study team (Department of Agriculture 1957). Thus, the community development agency, a government organization; cooperatives sponsored by the government; and Zilla Parishad, a local government organization, were the three agencies through which agricultural development was to be promoted. In retrospect, none of these agencies had a significant impact on agricultural production.[7]

In terms of financial outlay, the allocation for agriculture was increased from Rs3570 million in the First Plan to Rs5680 million in the Second Plan. With respect to total financial outlay, however, this increase actually represented a

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[4]For the most part, land reforms during this period took the form of abolishing zamindari and other intermediary rights and securing, for tenants, rights to the lands they cultivated. The former could be implemented relatively easily because peasants formed the rural backbone of the nationalist movement, whereas landlords tended to back the imperial power.

[5]This program was extended to cover the entire country by the end of 1963/1964. In April 1977, there were 5028 CD blocks within the country.

[6]The principal objectives of the Second Five-Year Plan included an increase in national income; rapid industrialization, with particular emphasis on the development of basic and heavy industries; increased employment opportunities and a reduction in inequalities of income and wealth; and a more even distribution of economic power (Planning Commission 1956).

[7]The system of panchayati raj, which extended local political control over large sections of the lower bureaucracy, was probably the most important institutional change facilitating expansion of the political base of the Congress Party (Weiner 1978).

reduction in funds allocated to agriculture from 15.1 to 11.8%. A similar situation occurred in the case of financial provisions for irrigation and power.[8]

Basically, the development strategy adopted for the Second Five-Year Plan gave primacy to large-scale heavy industry over agriculture. It was recognized that such a policy would result in lower employment; but this was to be remedied by developing agriculture and cottage industries simultaneously. Efficiency was to be increased through community development and other programs, as well as through better organization of labour.

Even though an extensive development organization was established in rural areas through the CD movement and an awareness of new inputs was created, this organization failed to have a major impact on growth because the majority of the rural poor lacked the resources for development (whatever resources were available were preempted by the better-off farmers) and because there was no new technology to be disseminated. Even the cooperative movement, which was unevenly developed among the different states, was dominated by the richer farmers who usually deprived the weaker sections of the facilities offered by the cooperatives. The performance of panchayati raj institutions had also been vitiated by political factionalism, rendering developmental thrusts either warped or diluted (Ministry of Agriculture and Irrigation 1978b).

Toward the end of the Second Five-Year Plan, it was clear that the generalized approach to agricultural development, through community development and a national extension agency supplemented by agricultural production programs (which were more or less a continuation and expansion of former GMF schemes), was not resulting in a rapid increase in food grain production. Through the initiation of the intensive agricultural district program (IADP), also known as the package program, experimentation was started in seven districts in 1961 and 1962, and later extended to 16 districts with one project in each state.[9] These pilot projects emphasized an immediate and rapid increase in production in most favourable areas through the application of a package of inputs and associated improved practices. The principle of intensifying agriculture through the application of a package of practices was extended, in 1964, to the intensive agricultural area program (IAAP), which covered about 1200 community development blocks in addition to the 300 blocks already covered by the IADP.[10] Although there was some increase in production in the areas covered by the program, the rate of growth was not impressive. The lack of emphasis on an appropriate technological base or adequate research support for increased production efforts resulted in much disillusionment. Moreover, no attention was paid to the problems of water control and management.

The principal aim of the Third Five-Year Plan (1961/1962 to 1965/1966), in the agricultural sector, was to achieve self-sufficiency in food grains and increase

[8]These financial allocations have been the subject of controversy among subsequent reviewers of agricultural policies. Although many people have commented adversely on the lower percentage allocation to agriculture in the Second Plan, Dantwala pointed out the positive aspect of higher financial allocations in quantitative terms.

[9]The IADP developed as a result of a recommendation by the agricultural production review team, sponsored by the Ford Foundation (1959). The Ford Foundation not only sponsored but also financed some aspects of the program for several years. A standing committee set up for the review and assessment of the program produced several evaluation reports, the most important being *Modernizing Indian Agriculture* (Ministry of Food, Agriculture, Community Development and Cooperation 1969).

[10]The major differences between the IADP and IAAP were that the IAAP was crop oriented and its extension staff support was less than that of the IADP.

agricultural production to meet the requirements of industry and export. The land policy of the Second Plan was reiterated. Price policy was designed to ensure that relative prices moved in accord with priorities and targets outlined in the plan and to prevent excessive increases in the price of essential goods consumed by low-income groups (Planning Commission 1961, p. 119).

One of the most severe droughts of the century occurred during the final year of the Third Plan, 1965/1966, with only a slight improvement in weather conditions in 1966/1967. During 1966 and 1967, India had to import 19×10^6 t of cereals to maintain its food distribution system and guard against widespread starvation. This period also exposed the vulnerability of Indian agriculture to adverse weather and the need to achieve food self-sufficiency as quickly as possible.[11]

Two basic changes characterized agricultural development policy during the Third-Plan period. Firstly, policy shifted from changing the attitudes and motivations of farmers to changing the environment under which farmers work. Secondly, variations in regional productivity were recognized and efforts were concentrated in those areas that showed optimum potential for development and where the response was greatest.

New Strategy for Agricultural Production

The period of the annual plans, 1966/1967 to 1968/1969,[12] witnessed the formulation of a new strategy for agricultural production that was favoured by three circumstances. First, the implementation of the "package program" showed that farmers were receptive to adopting new technology provided that the new methods were demonstrated and the benefits properly explained. Second, new high-yielding exotic strains[13] of wheat and paddy, which responded well under irrigated conditions and the application of heavy doses of fertilizers, were introduced and adapted in India after extensive field trials. Third, the government of India adopted the policy of assured remunerative prices[14] so that farmers' efforts to increase production would not be inhibited by the fear of an undue depression in prices. The new strategy consisted of introducing high-yielding varieties of cereals, accepting the policy of irrigation for optimum production, increasing the availability and use of scientific inputs, arranging access

[11]The deterioration of the food and agricultural situation was also reflected in the political situation during this period. In the general elections held in 1967, not only was the Congress Party returned to power, at the central government level, with a reduced majority but in nearly half of the states non-Congress Party governments came to power.

[12]The failure of agricultural production in 1965/1966 and 1966/1967 upset so many of the assumptions made in the original draft of the Fourth Five-Year Plan (1966/1967 to 1970/1971) that it was decided to treat the plans for 1966/1967 to 1968/1969 as annual plans and postpone the Fourth Five-Year Plan until the 5-year period beginning 1969/1970. This is an indication of the influence of agriculture on the Indian economy.

[13]The high-yielding exotic strains were insensitive to photoperiod and early maturing. They were short-stemmed and stiff-strawed and, hence, were nonlodging under heavy doses of fertilizer. Early maturation permitted more intensive cropping. Traditional varieties, on the other hand, were sensitive to photoperiod and, hence, late maturing. Under the application of fertilizers, the traditional varieties lodged and produced more vegetative growth than grain.

[14]The Agricultural Prices Commission was set up in January 1965 to advise government on a pricing policy for agricultural commodities. The Food Corporation of India, which was entrusted with the procurement and public distribution of food grains through its own as well as state agencies, was also set up during the same month.

to credit, and assuring remunerative prices. Even under the new strategy, however, there was no clear enunciation of a comprehensive agricultural policy.

Growth with Social Justice

The draft of the Fourth Five-Year Plan, 1969/1970 to 1973/1974, was published in March 1969, and contained a more explicit and elaborate presentation of issues associated with agricultural policy. Growth with *stability* was stated explicitly as the objective of the Fourth Plan. It was recognized that the pace of development within the agricultural sector set limits on the growth of industry, exports, and the economy as a whole, and constituted a major condition for achieving economic and social stability and improving the standard of living and nutritional status of the masses. Together with programs for increasing agricultural production, the plan provided for building sizable buffer stocks to even out supplies of food grains and other measures to stabilize food grain prices and price levels in general. More specifically, the first objective was to provide the necessary conditions for a sustained increase in agricultural production of about 5%/year (compared with 3.2% growth over the period 1949/1950 to 1964/1965). The second objective was to enable as much of the rural population as possible (including the small cultivator, farmer in dry areas, and agricultural labourer) to participate in development and share in its benefits, in accordance with the concept of growth with social justice, which was formally announced along with the budget documents for the year 1970/1971.[15]

The priority programs for agricultural development were grouped into two categories: those aimed at maximizing production and those aimed at remedying imbalances. This seemed to create a dichotomy in the programs between growth and social justice. The equity programs included pilot experiments for setting up small farmers' development agencies in 20 selected districts (subsequently increased to 46 districts), command area development projects, and programs for drought-prone areas.

Because the formulation of the Fourth Plan followed the enunciation of the new strategy for agricultural production, the role of technology as a major input in agriculture was recognized. In irrigated areas, commercialization of agricultural production was favoured, even in small units, through intensive agriculture, which would make it viable. In other areas of the country, which operated under rain-fed conditions, the strategy was to increase the supplementary activities of small farmers and provide them with fuller employment, thereby achieving social justice.

Detailed references were made to policies regarding prices, land reforms, mechanization, and credit and their implications. Selective mechanization was advocated. This would have the double advantage of adding to productivity by shifting to more labour-intensive activities and avoiding large-scale displacement of labour. The credit policy was aimed at institutionalizing agricultural credit to reduce borrowing directly from the government.

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[15]A confidential study, completed by the Home Ministry in December 1969, on the causes and nature of agrarian unrest between 1966 and 1969 predicted an explosive development with regard to relationships between the rich and the poor in rural areas unless appropriate preventive measures were taken. This led to the slogan "Garibi Hatao," which was the basis of subsequent special programs.

Thus, the special programs initiated during the Fourth Plan included the formation of small farmers' development agencies (SFDA) and marginal farmers' and agricultural labourers' development agencies (MFAL), and the initiation of the drought-prone area program (DPAP) and command-area development program (CADP).

The SFDA/MFAL projects[16] were designed to extend the benefits of economic development to the weaker sections in rural areas. Initially, 46 SFDA and 41 MFAL projects were started during the Fourth Plan. Subsequently, following a recommendation by the National Commission on Agriculture (1973a), the SFDA and MFAL projects were merged to form a single SFDA program covering small and marginal farmers and agricultural labourers, increasing the total number of projects to 168. The SFDA was a novel experiment in creating a new agency to which the central level of government could provide direct financial assistance without channeling it through state governments. However, this agency had only coordinating functions and had to depend upon the regular departmental agencies for implementing the programs.

The drought-prone area program extended over 74 districts in 13 states, which were identified as being prone to drought on the basis of objective criteria. These programs covered entire districts or parts of districts. Some of the projects were assisted by the World Bank.[17]

Although the irrigation policy for optimum production was accepted at the national level, very little was known about water management and use; consequently, the potential for irrigation, which had been created at great expense, remained unutilized. It was realized that the gap between the creation of irrigation potential, under major and medium irrigation schemes, and its utilization was due to a failure to undertake measures such as land leveling, construction of field channels, development of market roads, and other agricultural development activities before farmers could switch from dry cultivation to irrigated agriculture. This led to the formulation of the CADP, under which a new organizational model, the command-area development authority, was used to coordinate various activities related to irrigation, land development, agriculture, and cooperative credit. By December 1979, the program covered 12.4×10^6 ha in 50 irrigation projects spread over 108 districts in 13 states. Thirty-eight command-area authorities were set up to administer these projects; their success, however, was not uniform.

In addition to the CADP, other area development programs were initiated during the Fourth Plan in desert, hill, and tribal areas. The rationale for initiating these equity-oriented programs was the dramatic increases in yield per hectare, particularly with regard to wheat and in irrigated areas, that had been achieved by 1970/1971. It was thought that the green revolution would usher in the era

[16]The proposal for setting up these agencies was made by the all-India rural credit review committee under the chairmanship of B. Venkatappiah. The main emphasis in these projects is on crop husbandry, which includes intensive agriculture, multiple cropping, introduction of high-yielding varieties, horticulture, development of minor irrigation, soil conservation, land shaping, and land development, with emphasis on dry-farming practices and water-harvesting techniques in rain-fed areas. Subsidiary occupations, including milk production, poultry farming, pig farming, and sheep production, are funded separately and coordinated at the agency level.

[17]Development and management of irrigation, soil and moisture conservation, and afforestation; restructuring of cropping patterns and pasture development; and changes in agronomic practices, livestock development, and development of small and marginal farmers constituted the main elements of the strategy adopted under the program.

of plenty,[18] and that the government would soon have to attend to second and third generation problems of plenty.[19] There was also the need to avoid the social unrest and tensions in rural areas referred to earlier.

Although most of the equity-oriented programs were initiated during the Fourth Plan, they began to take shape during the Fifth Plan. Thus, eliminating poverty and attaining economic self-reliance were the major tasks proposed by the Fifth Five-Year Plan, with growth for social justice being the principal objective with respect to agricultural development. Emphasis was also placed on employment-oriented agriculture, with greater stress on dry farming and diversification of agriculture, including development in crop production, horticulture, animal husbandry, dairy farming, and fisheries programs. Rural public works, pilot intensive rural employment projects, and integrated rural development programs were also initiated so that, consistent with agricultural growth, employment problems would also receive proper attention (Planning Commission 1974).

The draft Medium-Term Plan, 1978–1983, formulated in April 1978,[20] envisaged greater emphasis on agriculture, in terms of financial allocations and the acceleration of irrigation and fertilizer programs. This draft was revised in December 1979 and another draft Sixth Five-Year Plan, 1978–1983, was published.[21] The programs and policies proposed for achieving growth for social justice and eliminating unemployment and underemployment within 10 years were essentially the same as those put forward during the Fifth Five-Year Plan. In addition, detailed guidelines were drawn up and communicated to the states with regard to the integrated rural development program[22] and block-level planning. Food-for-work programs (renamed national rural employment programs) were taken up on a large scale, and the scope of the minimum-basic-needs programs was expanded as well. More emphasis was given to the development of small-scale and cottage industries by setting up district industries centres, with built-in arrangements for monitoring the programs.

The draft Sixth Plan refers to seven specific measures for redistributing income in favour of the poor in an attempt to secure distributive justice (Planning Commission 1979a): distribution of surplus land to landless cultivators; subsidies and preferred access to credit and farm inputs for small and marginal farmers; debt relief and provision of consumption credit; operation of public distribution systems for essential supplies; provision of basic needs; development of tribal areas

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[18]Food grain production in 1970/1971 reached a record level of 108.42 $\times 10^6$ t. Imports fell to 2×10^6 t in 1971 and, taking the quantities supplied to East Pakistan into account, there were net exports of 0.5×10^6 t of cereals in 1972. Food grain prices were stable during 1970 and 1971. Grain stocks increased to 8.1×10^6 t by the end of 1971. Some regulatory controls were lifted and there were many signs of an easing food situation, which, in retrospect, was short-lived.

[19]The National Commission on Agriculture, established in August 1970, was expected to look into the second and third generation problems of plenty created by the success of the green revolution.

[20]There was a change in the central government in February 1978. The new government decided to terminate the Fifth Plan in 1977/1978 and adopt a system of rolling plans from 1978/1979 onward. The draft five-year plan, 1978-1983, therefore, represents a medium-term plan covering this period.

[21]Before this draft was finalized, there was another change in the central government, and a new Sixth Five-Year Plan was formulated covering the period 1980–1985. This monograph, however, only deals with developments up to the middle of 1980.

[22]The objectives of the enlarged integrated rural development program included growth in production, benefits to identified target groups in disadvantaged sections of the rural community, and full employment within a given time frame. By 1982/1983, it was proposed to cover 2000 of the 3000 blocks already under special programs and an additional 1500 blocks at a rate of 300 per year.

and economic betterment of scheduled castes; and organization of the poor to ensure effective implementation of these measures.

The problems being tackled are so vast, coverage of most of the programs is so inadequate with respect to needs, and program implementation is so tardy that it is doubtful that these new measures will have a substantial impact on income distribution by the end of the Sixth Plan.

Conclusions

This review has shown that, until the last decade of colonial rule in India, there was no comprehensive agricultural policy. Although some measures were taken to relieve distress in rural areas, particularly after a famine, these steps did not constitute a positive policy toward attaining social justice.

The government's intervention in and direct assistance to agricultural production (particularly food grains) began during World War II, with the launching of the grow-more-food campaign in 1943. This policy, aimed at increasing food grain production, was implemented through a number of schemes. In January 1946, the Government of India issued a statement on agricultural and food policy in India. The objectives expressed in the statement covered not only production aspects but also distribution of food and securing social justice through remunerative prices for producers and fair wages for agricultural labourers. Because of the political changes that took place after its issue, however, this policy statement never became operational.

The post-Independence period was marked by continuous evolution of different segments of agricultural policy under various five-year plans. The emphasis of these plans changed over time, e.g., social justice, although a constant objective of the plans, was not always a high priority. The emphasis, particularly in the intensive agricultural development programs of the earlier plans, was on a rapid increase in production in favourable areas and attaining self-sufficiency in food grains. The latter objective was achieved by the mid-1970s, largely as a result of the adoption of a new strategy for agricultural production based on the cultivation of high-yielding varieties of cereals. This strategy, which was confined to certain crops and areas with assured irrigation, also resulted in the widening of interpersonal and interregional disparities. Consequently, the attention of the government was focused on measures to reduce these disparities and secure social justice through SFDA and the DPAP. Yet, the social justice objective, in terms of reducing unemployment or underemployment and alleviating poverty in rural areas, remained largely unfulfilled. Thus, the conflicts between the growth and equity objectives of public policy became sharper after the introduction of the new strategy.

3. Growth in Production

Review of Progress

Long-term production trends show annual growth rates of about 2.7% for food grains, as well as for all crops, during the period 1949/1950 to 1978/1979.[1] A comparison of growth rates between the periods 1949/1950 to 1964/1965 and 1967/1968 to 1978/1979 shows that even though growth in productivity was higher after the green revolution, annual increases in both area and production were still lower than those before the introduction of the new technology (Table 3.1). Between 1967/1968 and 1978/1979, even though the output of wheat grew at 6%/year, because wheat formed only 26.6% of food grain output, this growth was partly offset by lower increases in rice (2.6%) and slower or negative growth in other food grains (Table 3.2).

Table 3.1. Compound rates of growth of agricultural production, area under crops, and yields, all India. (All values are percentages per year.)

	1949/1950 to 1964/1965	1949/1950 to 1978/1979	1967/1968 to 1978/1979
Food grains			
Production	2.98	2.66	2.77
Area	1.34	0.84	0.44
Yield	1.61	1.52	1.84
Non-food grains			
Production	3.61	2.76	2.88
Area	2.52	1.42	1.19
Yield	1.06	0.93	1.25
All crops			
Production	3.19	2.68	2.81
Area	1.55	0.96	0.63
Yield	1.60	1.35	1.63

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. Indian agriculture in brief. Various editions.

NOTE: The growth rates given in Table 3.1 are published by India, Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. They are based on the index numbers of production area, and yield of food grains, non-food grains, and all crops. In computing the group index of yield, the directorate adopts the formula:

$$\text{Index of yield} = [(\Sigma\, a_{ij}\, Y_{ij}\, p_{io})/(\Sigma\, a_{ij}\, Y_{io}\, p_{io})] \times 100$$

where a_{ij} and a_{ij} represent areas under ith crop in the base year and jth year. Y_{io} and Y_{ij} yields per hectare in the base year and jth year, and p_{io}, price per unit of the ith crop in the base period. Hence, the growth rates of area and yield do not add up to the growth rate in production even after allowing for the interaction term.

[1]Computation of growth rates in crop production, where seasonal factors cause annual fluctuations, is a tricky task. Depending upon the length of the period covered, its beginning and end points, and the computation formula adopted, rates of growth differ widely, even after the production data are adjusted for changes in coverage and methods of estimation. Point-to-point growth rates are the simplest to compute provided care is taken to ensure that the two points are comparable from the point of view of weather and its effect on production.

Table 3.2. Compound growth rates of area under food grains, production, and yield from 1960/1961 to 1978/1979 and 1967/1968 to 1978/1979, all India. (All values are percentages per year.)

Crops	1960/1961 to 1978/1979			1967/1968 to 1978/1979		
	Area	Production	Yield	Area	Production	Yield
Rice	0.75	2.05	1.29	0.82	2.64	1.80
Jowar	−1.02	0.61	1.65	−1.49	2.07	3.62
Bajra	0.02	2.32	2.29	−1.26	0.28	1.53
Maize	1.71	2.07	0.35	0.05	−0.04	−0.07
Ragi	−0.01	1.74	1.75	1.00	3.98	2.97
Wheat	3.37	7.54	4.03	3.16	6.02	2.76
Barley	−1.98	−0.37	1.61	−3.36	−1.95	1.39
Cereals	0.72	2.94	1.82	0.41	3.05	2.07
Gram	−1.39	−0.72	0.66	0.29	0.66	0.31
Tur	0.26	0.81	0.55	0.02	0.67	−0.66
Pulses	−0.36	−0.26	0.23	0.74	0.54	−0.07
Food grains	0.48	2.56	1.65	0.44	2.77	1.84

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics (1980).

The performance of Indian agriculture, particularly its rates of growth and the factors influencing them, has been studied by several researchers. Some of the conclusions reached include: (1) area contributed more to the increase in production until 1960/1961, with increases in productivity being the main contributing factor thereafter; (2) wheat production grew more rapidly than that of other crops, this growth tapering off during the early 1970s; (3) production growth in the eastern states was much lower than the national average; (4) production grew fastest in Gujarat and Punjab before 1964/1965 and in Punjab and Haryana thereafter; and (5) about 75% of the growth in crop output could be explained by the growth of irrigation. Narain (1977) studied the growth rate of productivity by decomposing it and segregating the changes in cropping pattern and the spatial shifts of crops. He found that the pure yield effect was distinctly higher after the green revolution. It increased from 0.54%/year between 1952/1953 and 1960/1961 to 1.33%/year between 1961/1962 and 1972/1973. Narain also found that nonprice factors were responsible for much of the growth. Regarding instability in food grain production, a recent study by Mehra (1981) shows that during the periods 1949/1950 to 1964/1965 and 1967/1968 to 1977/1978, the standard deviation and coefficient of variation of production for all crop aggregates and for many of the individual crops examined increased and that fluctuations in yield were the dominant force behind the increased variability.

Growth in food grain production was not uniform between 1949/1950 and 1978/1979. Table 3.3 shows the relevant point-to-point growth rates.

Table 3.3. Percentage annual growth of food grain production.

Period	Growth rate	Period	Growth rate
1949/1950 to 1960/1961	2.8	1964/1965 to 1970/1971	3.3
1949/1950 to 1964/1965	2.6	1964/1965 to 1975/1976	2.8
1949/1950 to 1970/1971	2.8	1964/1965 to 1978/1979	2.8
1960/1961 to 1964/1971	2.1	1970/1971 to 1975/1976	2.2
1960/1961 to 1970/1971	2.8	1970/1971 to 1978/1979	2.4
1960/1961 to 1975/1976	2.6	1975/1976 to 1978/1979	2.8

Source: Mellor (1976, p. 39).
NOTE: Growth rates for periods after 1970/1971 have been calculated using Mellor's methodology.

Table 3.4. Annual percentage growth of food grain producton in the major states, 1960/1961 to 1978/1979.

State	Growth rate	State	Growth rate
Andhra Pradesh	1.69	Maharashtra	1.77
Assam	2.36	Orissa	1.19
Bihar	1.92	Punjab	8.01
Gujarat	3.56	Rajasthan	2.97
Haryana	5.33	Tamil Nadu	1.83
Karnataka	3.40	Uttar Pradesh	2.79
Kerala	1.39	West Bengal	2.72
Madhya Pradesh	1.67	All India	2.77

Source: Alagh and Sharma (1980).

Growth rates of food grain production in the major states, from 1960/1961 to 1978/1979, were also uneven (Table 3.4). Punjab and Haryana led with average growth rates of 8.0 and 5.3%/year, respectively, whereas Orissa, Kerala, Madhya Pradesh, and Andhra Pradesh each had growth rates of less than 1.7%.

With regard to growth at the district level, an analysis carried out jointly by Jawaharlal Nehru University and the Planning Commission showed widely differing rates (Table 3.5). The yield effect constituted the major and predominant component of growth in most of the high-growth districts, whereas, in general, area increases accounted for a much smaller share. In medium-growth districts, no clear-cut pattern emerged, although yield increase ceased to be a predominant factor of growth. In districts with negative growth, both area and yield decreases were responsible for deceleration.

Although the contribution of new technology to the acceleration of wheat production is acknowledged by all researchers, there is some controversy over its impact on the production of food grains and overall agricultural production. Mitra (1968) claimed that the growth rates of food grain output actually declined during the 1960s. Minhas and Srinivasan (1968) showed that such claims were based on the adoption of inadmissible procedures in the fitting of trends and that the years 1965/1966 and 1966/1967 were abnormal years and should be excluded from the trend. Subsequently, Srinivasan (1972) showed that there was

Table 3.5 Growth rates of crop production, 1962–1965 to 1971–1974.

Growth rate (%)	Number of districts	Location
> 4.5	48	Rajasthan (12), Punjab (11), West Uttar Pradesh (8), Haryana (5), Karnataka (4), Gujarat (4), Jammu and Kashmir (2), Tamil Nadu (2)
1.5–4.5	102	Uttar Pradesh (28), Madhya Pradesh (24), West Bengal (12), Rajasthan (8), Bihar (5), Gujarat (5), Assam (4), Karnataka (4), Kerala (4), Tamil Nadu (4), Andhra Pradesh (2), Haryana (2)
0–1.5	62	Madhya Pradesh (12), Uttar Pradesh (11), Gujarat (5), Tamil Nadu (5), Karnataka (5), Andhra Pradesh (4), Rajasthan (4), Bihar (3), Kerala (3), Maharashtra (3), Assam (3), Orissa (3), West Bengal (1)
<0	72	Maharashtra (23), Andhra Pradesh (11), Orissa (8), Madhya Pradesh (7), Bihar (7), Karnataka (6), Gujarat (6), Rajasthan (2), Uttar Pradesh (1), West Bengal (1)

Source: Bhalla and Alagh (1978).

no evidence of either acceleration or deceleration in the rates of growth of food grains during the periods 1949/1950 to 1964/1965 and 1949/1950 to 1969/1970, when the unusual years were excluded. Rao (1975) compared the growth rate of food grain output between peak periods in the 1950s and 1960s and came to the conclusion that "there is reason to believe that even without the green revolution, the growth rate would have been maintained at 2 to 1.5 percent per annum." Dantwala (1978), however, did not share Rao's views. He concluded that the high-yielding variety technology brought about significant improvement in the productivity of cereal crops (except jowar), although its overall impact on food grain production, especially in per capita terms, was not significant.

Dividing the period 1949/1950 to 1977/1978 into two — before and after the green revolution — Srinivasan (1979) came to the conclusion that "while there has been a decline in the rate of growth of gross sown area, in particular under non-food crops in the decade starting from 1967/1968 compared to the 15 years ending in 1964/1965, the output (and yield per unit area) of food crops and all crops grew more or less uniformly over the entire period with no evidence of acceleration or deceleration since 1967/1968. The dominant conclusion, alas, is that there is yet no green revolution, but it is still a wheat revolution." Rudra (1978), after analyzing data on agricultural and food grain output from 1951/1952 to 1973/1974, also asserted that "there has been no such thing as a green revolution as a result of the introduction of new strategy or otherwise" and that "for the country as a whole and agriculture as a whole, the strategy has not succeeded."

To examine whether or not the high-yielding varieties program had any influence on accelerating growth rates, it would be best to consider the period after the introduction of the new technology in three phases: (1) 1966/1967 to 1970/1971, (2) 1971/1972 to 1974/1975, and (3) 1975/1976 to 1978/1979. Relevant data on area under high-yielding varieties, irrigated area under food grains, consumption of fertilizers, and output of food grains are presented in Table 3.6.

During the first phase, the high-yielding varieties proved to be an instant success and the area under them expanded rapidly, as did fertilizer use. In 1970/1971, two-thirds of the irrigated land and 35% of the total area under wheat was under high-yielding varieties; whereas in the case of rice, the respective percentages were only 38 and 15%. The irrigated area under food grains increased by nearly 25% in 6 years, or 3.8%/year. The 3.3% annual rate of growth of food grain production between 1964/1965 and 1970/1971 was, no doubt, due to the expansion of irrigation, fertilizer use, and area under high-yielding varieties. This was higher than the average rate between 1960/1961 and 1970/1971 or 1949/1950 and 1970/1971.

During the second phase, fertilizer use, area under irrigation, and food grain production stagnated. It may be argued whether or not this slowing down should be attributed to weather alone, deterioration in seed quality, incidence of wheat rust, tight fertilizer supplies, complacency in the wake of the success of high-yielding varieties, or preoccupation with the implementation of new target-group oriented and area-development schemes designed to secure social justice.

During the last phase, irrigation increased, fertilizer consumption rose in 1976/1977, and area under high-yielding varieties of rice increased in 1977/1978. Food grain production in 1976/1977 showed an increase of 3.5%/year since 1972/1973 and, subsequently, reached a record level of 131.37×10^6 t in 1978/1979, 53.8×10^6 t of which was rice.

Thus, the new strategy for agricultural production, based on the high-yielding varieties program, contributed to growth in production and productivity. How-

Table 3.6. Progress of food grain production programs, 1964/1965 to 1978/1979.

Year	Area under high-yielding varieties (Mha)			Total fertilizer consumption ($\times 10^6$ t)	Irrigated area under food grains (Mha)	Area under food grains (Mha)	Production ($\times 10^6$ t)		
	Cereals	Wheat	Rice				Food grains	Wheat	Rice
1964/1965	—	—	—	0.77	23.94	118.11	89.37	12.25	39.32
1966/1967	1.89	0.54	0.88	1.10	25.79	115.30	74.23	11.39	30.44
1967/1968	6.04	2.94	1.78	1.54	26.10	121.42	95.05	16.54	37.61
1968/1969	9.20	4.80	2.60	1.76	28.05	120.43	94.01	18.65	39.76
1969/1970	11.40	4.92	4.34	1.98	29.55	123.57	99.50	20.09	40.43
1970/1971	15.38	6.48	5.59	2.26	30.12	124.32	108.42	23.83	42.23
1971/1972	18.17	7.86	7.41	2.66	30.54	122.62	105.17	26.41	43.07
1972/1973	22.09	10.00	8.11	2.77	30.74	119.28	97.03	24.74	39.25
1973/1974	26.00	11.00	10.00	2.84	31.17	126.54	104.67	21.78	44.05
1974/1975	27.30	11.20	11.20	2.58	33.26	121.08	99.83	24.10	39.58
1975/1976	31.90	13.50	12.40	2.90	34.08	128.18	121.03	28.85	48.74
1976/1977	33.60	14.50	13.30	3.43	34.24	124.36	111.17	29.01	41.92
1977/1978	38.00	15.50	15.60	4.28	36.25[a]	127.52	126.41	31.75	52.67
1978/1979[b]	41.10	16.10	16.90	5.12	NA	128.12	131.37	34.98	53.83

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. Indian agriculture in brief. Various editions.
NOTE: NA = not available.
[a]Estimated value.
[b]Values are provisional.

ever, because this growth was largely confined to wheat and irrigated areas, its impact was not reflected in the overall growth of food grain production for the country. Without the introduction of high-yielding varieties of cereals, however, growth rates might have been slower because the scope for increasing the area under crops was limited, except through double cropping.

About 44.2% of total food grain production in 1975/1976 was produced on irrigated land, which formed only 26.6% of the area under production. Although separate growth rates for irrigated and nonirrigated production are not available, it is interesting to note that if rain-fed production increases by 1%/year, irrigated production must increase by 5.3%/year to achieve an overall growth rate of 3%/year over a period of 10 years. If rain-fed production does not increase, the rate of increase in irrigated production must be even higher. This explains why overall growth rates remained modest at around 2.6 – 2.8%/year.

Wheat grew very well in northwestern India, and rice, until recently, grew poorly in eastern India and parts of southern India. The reasons for these variations are not difficult to find. Wheat is grown in the fertile, alluvial soils of the Indo-Gangetic Plains, where the average size of holdings is larger than the national average, the holdings are consolidated, irrigation was well developed even before the advent of new technology, and winter rainfall is assured as well as supplemented by irrigation. In addition, problems resulting from pests and diseases are less severe, and the marketing system is well developed. In contrast, rice is traditionally grown in hot, humid deltas of rivers in small, fragmented, and scattered holdings. It is also grown during the monsoon season, when problems resulting from pests and diseases are severe and flooding and waterlogging are frequent. Also, the marketing system for rice is less developed. Above all, net returns from high-yielding varieties of rice were lower than those from improved local varieties, which enjoyed a higher price per unit of the crop. Recently, efforts were made to evolve varieties of paddy, of acceptable quality and with built-in resistance to pests and diseases, suited to the agroclimatic environment of each area.

In retrospect, the early success and rapid spread of high-yielding varieties of wheat had some beneficial effects on the overall economy. The sharp increase in wheat production, which resulted in the procurement of large surpluses, enabled the country to reduce wheat imports and attain self-sufficiency. Rapid increases in rice production in northwestern India, an area in which rice is not generally consumed, enabled states that were deficient in rice to increase their supplies. Although the high prices paid to farmers for wheat resulted in large subsidies inherent in the distribution of grain at lower prices through fair-price shops, food prices stabilized between 1976 and 1978 and helped control the rate of inflation.

The success of the green revolution changed the psychological attitude of farmers, bureaucrats, and politicians. Farmers found that, given the inputs, water, fertilizers, and credit, the new technology was within their reach. For bureaucrats, the green revolution provided a challenge to evolve the administrative setup needed to ensure that these inputs were available to all farmers. For politicians, the achievements created an opportunity to improve the living standards of many people.

Prospects

With regard to prospects for the future, Vaidyanathan (1977), after a critical review of crop production performance, observed that "the fact that after a

decade of rapid spread of HYVs, growth rates of production have not increased, and may have in fact fallen, compels a sober assessment of the prospects based on the current strategy."

Bhalla (1977), after reviewing rates of growth at the district level, shared the same view: "It is more difficult to increase rate of growth in foodgrain production in the future than in the past. For where it is easiest to introduce new technology, it has already been done. To sustain fast growth rates, it has to be extended to more difficult areas and more difficult farmers within easy areas." Analyzing the rice and wheat districts separately, Bhalla felt that in many of the slow-growing wheat districts considerably larger investment in infrastructure was necessary; whereas in the slow or negative growth rice districts investment was necessary but by itself would be insufficient to overcome institutional barriers. If these barriers could be overcome, however, Bhalla believed that, in low growth – high potential areas, returns on investments could be higher.

Thamarajakshi and Rao (1978) were more optimistic. They observed: "With the focus in the current design for agricultural development on the rapid extension of irrigation, popularization of improved cultural practices, including the larger use of fertilizers and plant protection measures, and the effective transfer of technology to the farmers, the country is on the threshold of newer vistas in crop production and hence of a real 'green revolution' as distinct from the 'amber' revolution experienced earlier. The agricultural scenario today has undergone a quantitative change and with the achievement of a decisive breakthrough in food production, the country has emerged from the 'scarcity trap'."

The difference between the mean yields in national demonstrations and all-India average yields of agricultural crops (Table 3.7) indicates that, even in irrigated areas, there is considerable scope for increasing yields.

The draft Sixth Five-Year Plan, 1978–1983 (revised), aims at an annual growth rate in food grain production of 3.2%, compared with the more ambitious targets of 5.6% in the Third and Fourth Plans and 4.2% in the draft of the Fifth Plan. The actual achievements have been much lower; however, as revealed in a recent study, the increase in food grain production between 1960–1962 and 1975–1977 (30.19×10^6 t) was consistent with the production potential, totaling 33.47×10^6 t, created during this period as a result of additional irrigation, additional fertilizer use, increased area, and a shift in cropping pattern (Table 3.8). The major programs designed to promote increased food grain production in the draft Sixth Five-Year Plan include 13.8 Mha of additional irrigation (of which 11 Mha will benefit food grains) and consumption of 7.85×10^6 t of NPK fertilizers (of which 5.9×10^6 t will be applied to food grains). Even without a

Table 3.7. Yields obtained in national demonstrations versus average yields of irrigated crops.[a]

Crop	National demonstrations		All-India average yields of irrigated crops (kg/ha)
	Number	Mean yields (kg/ha)	
Rice	875	3431	1620
Wheat	875	3814	1724
Maize	189	3238	1694
Sorghum	135	3554	1017
Bajra	115	2142	1229

Source: Ministry of Agriculture and Irrigation (1978a, p. 113).

[a]All-India average yields of irrigated crops were derived from data from various states on irrigated area and yield per hectare of irrigated crops, based on crop-cutting experiments. Also, results given for rice are in terms of rice.

Table 3.8. Additional production potential and increase in production of food grains between 1960–1962 and 1975–1977.

Input	1960–1962 (average)	1975–1977 (average)	Increase	Coefficient	Additional production potential ($\times 10^6$ t)
Irrigation (Mha)	22.12	34.66	12.54	0.50	6.27
Fertilizer (NPK)($\times 10^6$ t)	0.21	2.20	1.99	10.00	19.90
Area (Mha)	116.21	124.44	8.23	0.45	3.70
Shift in cropping pattern (wheat and rice)(Mha)	47.51	58.43	10.92	0.33	3.60
Actual production ($\times 10^6$ t)	80.62	110.81	30.19		

Source: Sarma and Roy (1979).

change in area under food grains or a large shift in cropping pattern, the additional production potential to be created during the 1978–1983 period amounts to 32 $\times 10^6$ t over the base level.[2] Thus, if the irrigation and fertilizer targets under the Sixth Plan are achieved, the growth rate of food grain output will exceed 3.2%.

A recent study on the impact of irrigation on multiple cropping in India (Narain and Roy 1980) also comes to the conclusion that the irrigation expansion called for in the Sixth Plan might yield an annual increase of 1% in the cropping intensity and that, even if the growth rate of productivity does not improve but continues at its present rate, agricultural output could increase by 3.5%/year. If, in addition, an increase in productivity occurs, it would be possible to reach the targeted growth rate of 4%/year.[3]

[2]The response coefficients adopted for calculating these estimates are modest compared with the potential if inputs are utilized efficiently.

[3]The targeted growth rate in agricultural production of 4% is based on the original draft of the five-year plan 1978–1983.

4. Impact of New Technology and Special Programs on Interpersonal and Interregional Disparities

The initial success of the green revolution led to considerable discussion on the effects of new technology on growth and equity. A number of people believed that, although the yield-increasing technology would step up growth in agricultural production, it would also widen existing disparities in income. Their apprehensions took into consideration prevailing disparities in land ownership and operation, differential access to inputs and differing rates of adoption of the new technology by various classes of farmers, and the impact of increased mechanization of large farms on employment of labour.

It is evident that, where land distribution remains skewed, the direct effect of a technology that increases output per unit of land, such as a technology based on the adoption of high-yielding variety seeds, will be to widen disparities in the absolute levels of family earnings from these crops. What is more pertinent is not whether this form of technological change widens interpersonal disparities in absolute incomes of different groups of farmers but whether the resulting income growth is restricted to only some groups of farmers or is widespread. Also, where the new technology is applicable to irrigated and assured-rainfall areas, there is no question that interregional disparities will widen. For areas that are not irrigated or rainfall is unpredictable, a question arises regarding the type of measures necessary to improve the productivity and incomes of people living in these areas.

Interpersonal Disparities

Landholding Structure

Available data on household ownership holdings, based on the national sample surveys, indicate that between 1953/1954 and 1970/1971, the total number of rural households owning land increased from 49 million (77% of all rural households) to 71 million (90% of all rural households) (Table 4.1). The average size of the holding, however, decreased from 2.5 to 1.7 ha. Within the different size classes, the number of marginal holdings increased by nearly 70% and the area of marginal holdings by 50% during this period. Small holdings (1–2 ha) increased by about 40% in both number and area. Large holdings declined by about 25% in number and 40% in area. Changes in the absolute number and area of medium holdings were relatively small. In terms of proportions, the number and area of marginal holdings increased, whereas the number and area of large holdings declined. Much of the increase in the number of marginal holdings took place between 1953/1954 and 1960/1961 and could be attributed to about 11% of the rural households having no land or less than 0.002 ha acquiring some land.

Table 4.1. Percentage distribution of household ownership holdings, all India (rural).

Size of holding (ha)	1953/1954		1960/1961		1970/1971	
	Number	Area	Number	Area	Number	Area
<1	49.60	6.23	54.78	7.59	58.63	9.76
1–2	17.54	10.09	17.16	12.40	17.14	14.67
2–4	16.25	18.40	14.56	20.52	13.22	21.92
4–10	11.93	29.11	10.27	31.25	8.66	30.74
>10	4.68	36.17	3.23	28.24	2.35	22.91
Total number of households ($\times 10^6$)	48.86		64.00		70.81	
Total area (Mha)		123.60		128.69		119.64

Sources: National Sample Survey (1968); National Sample Survey Organization (1976).

Data on operational holdings, based on the national sample surveys,[1] show similar trends, although the magnitudes of the changes are different (Table 4.2). According to the all-India agricultural census, 1970/1971, nearly 70% of operational holdings were less than 2 ha in size and operated a little more than one-fifth of the cultivated area. Again, 70% of these holdings (or nearly half of the total) were less than 1 ha in size (belonging to the marginal category), whereas small holdings account for one-fifth of the total number of holdings and operate 12% of the area (Table 4.3). At the other end of the scale, 4% of the holdings are >10 ha in size and account for 31% of the cultivated area. The average size of the 70.5 million holdings in 1970/1971 was 2.3 ha.

The agricultural census was repeated in 1976/1977, but on a sample survey basis. The provisional data show that the total number of operational holdings has increased to 81.5 million, an increase of 14.8% since 1970/1971. The largest increase (23%) occurred in the number of marginal holdings; whereas large holdings decreased by 11.9% (Table 4.4). The average size of holdings declined from 2.3 to 2.0 ha.

Table 4.2. Percentage distribution of household operational holdings, all India (rural).

Size of holding (ha)	1953/1954		1960/1961		1970/1971	
	Number	Area	Number	Area	Number	Area
<1	39.14	5.43	39.07	6.86	45.77	9.21
1–2	20.86	10.01	22.62	12.32	22.38	14.80
2–4	19.73	18.62	19.80	20.70	17.66	22.52
4–10	14.40	29.32	13.99	31.17	11.11	30.49
>10	5.87	36.62	4.52	28.95	3.08	22.98
Total number of households ($\times 10^6$)	44.35		50.77		57.07	
Total area (Mha)		135.16		133.38		125.68

Sources: National Sample Survey (1968); National Sample Survey Organization (1976).

[1]There is an important difference in the way national sample survey (NSS) data and agricultural census data are obtained. The results of the agricultural census are derived by tabulation of basic data from land records, whereas those of the NSS are derived by direct inquiries from a sample of households.

Table 4.3. Distribution of operational holdings, all India, 1970/1971 (agricultural census).

Category	Size (ha)	Distribution (%)	Percentage of total cultivated area
Marginal	<1	50.6	9.0
Small	1–2	19.0	11.9
Semimedium	2–4	15.2	18.5
Medium	4–10	11.3	29.7
Large	>10	3.9	30.9

Source: Ministry of Agriculture and Irrigation (1975).

Table 4.4. Comparison of operational holdings, 1970/1971 and 1976/1977 (agricultural census).

Category	Number ($\times 10^6$)		Change (%)	Area (Mha)		Change (%)
	1970/1971	1976/1977		1970/1971	1976/1977	
Marginal	36.20	44.53	23.0	14.56	17.50	20.2
Small	13.43	14.70	9.5	19.28	20.86	8.2
Semimedium	10.68	11.64	9.0	30.00	32.36	7.9
Medium	7.93	8.21	3.5	48.23	49.60	2.8
Large	2.77	2.44	−11.9	50.06	42.82	−14.5
Total	71.01	81.52	14.8	162.13	163.14	0.6

Source: Ministry of Agriculture and Irrigation (1980).

Among the states, large increases in marginal holdings were reported in Bihar (48.0%), Rajasthan (40.4%), West Bengal (38.5%), and Kerala (28.0%). Large decreases in holdings >10 ha were reported from West Bengal (47.2%), Bihar (38.3%), Orissa (27.1%), and Tamil Nadu (22.3%) (Table 4.5).

Table 4.5. Percentage change in the number of operational holdings between 1970/1971 and 1976/1977.

State	Category					
	Marginal (<1 ha)	Small (1–2 ha)	Semi-medium (2–4 ha)	Medium (4–10 ha)	Large (>10 ha)	All sizes
Andhra Pradesh	15.1	17.6	13.9	9.3	−10.4	13.5
Assam	19.9	9.2	7.3	2.6	2.8	14.7
Bihar	48.0	7.4	1.4	−4.5	−38.3	31.1
Gujarat	13.3	16.5	17.5	11.6	−17.1	11.5
Haryana	23.2	8.2	2.5	4.7	−2.7	9.3
Karnataka	17.9	5.8	3.7	1.4	−9.1	7.3
Kerala	28.0	4.5	−9.5	26.8	−4.7	24.0
Madhya Pradesh	17.5	23.0	18.6	8.6	−7.4	14.4
Maharashtra	21.2	30.0	23.2	10.0	−17.2	16.4
Orissa	12.9	−7.1	32.7	−24.8	−27.1	5.0
Punjab[a]	23.2	5.0	−0.8	2.2	−10.9	3.8
Rajasthan	40.4	15.7	12.3	8.9	−2.9	7.1
Tamil Nadu	26.4	1.5	−1.8	−6.0	−22.3	15.0
Uttar Pradesh	12.6	3.4	−1.5	−4.0	−13.2	8.5
West Bengal	38.5	15.0	−2.2	−27.1	−47.2	24.9

Source: Ministry of Agriculture and Irrigation (1980).
[a]Values for this state are estimates.

Agricultural Labour

Agricultural labourers, the majority of whom are landless (around 60%), form a large segment of the rural poor. According to the Rural Labour Enquiry, 1974/1975, the number of rural labour households increased from 18 to 25 million from 1964/1965 to 1974/1975; whereas their proportion of the total number of rural households rose from 25 to 30%. The number of agricultural labour households increased from 15 to 21 million, with a corresponding increase in the number of agricultural workers from 31 to 46 million (Table 4.6).

The bulk of this class is drawn either from peasants who have been uprooted from the soil due to various economic and noneconomic compulsions or from semifeudal tenants, subtenants, and sharecroppers who have been denied any right to the land and are, therefore, compelled to sell their labour under adverse conditions (National Commission on Agriculture 1976, Part XV, p. 153).

Tenancy

Apart from the fact that large numbers of small and marginal farmers have too small a land base, many of them do not own the land they cultivate. Although the agricultural census, 1970/1971, reported that only about 9% of the area was partly or wholly leased, it was admitted that oral leases might have gone unrecorded in the census (Ministry of Agriculture and Irrigation 1975, p. 40). According to the population census, 1961, the area under tenancy was 23% of the total area under cultivation. With regard to trends, national sample survey data for 1960/1961 and 1970/1971 show no significant change in the overall percentage of leased land to total operational area during this period (Table 4.7).

Table 4.6. Number of rural households and agricultural labour households, all India, 1964/1965 and 1974/1975.

	1964/1965	1974/1975
Agricultural labourers ($\times 10^6$)	30.8	46.4
Rural working force ($\times 10^6$)	173.6	206.3
Percentage of agricultural labourers to total rural working force	17.7	22.5
Rural households ($\times 10^6$)	70.4	82.1
Agricultural labour households ($\times 10^6$)	15.3	20.8
Rural labour households ($\times 10^6$)	17.9	24.9

Source: Planning Commission (1979a, p. 155).

Table 4.7. Changes in tenancy, all India, 1960/1961 to 1970/1971.

	1960/1961				1970/1971			
Size of holding (ha)	Operational area (Mha)	Owned area (Mha)	Leased area (Mha)	Percentage leased	Operational area (Mha)	Owned area (Mha)	Leased area (Mha)	Percentage leased
<1	9.1	7.6	1.5	16.6	11.6	9.4	2.2	18.9
1–2	16.4	14.1	2.3	14.0	18.6	15.9	2.7	14.6
2–4	27.6	24.4	3.2	11.8	28.3	25.0	3.3	11.7
4–10	41.5	37.5	4.0	9.6	38.3	35.0	3.3	8.7
>10	38.5	35.3	3.2	8.3	28.9	27.1	1.8	6.0
Total	133.1	118.9	14.2	10.7	125.7	112.4	13.3	10.6

Sources: National Sample Survey (1968); National Sample Survey Organization (1976).

Yet, the area leased by small and marginal farmers has increased, whereas the area leased by medium and large farmers has decreased. Also, it is significant that small and marginal farmers lease larger proportions of their operational area than medium and large farmers.

The observed trends in land holding structure are largely a result of demographic pressures, implementation of land reform measures involving fixation of ceilings on land holdings (or anticipation thereof), programs for allotting surplus land to landless labourers, and tenancy laws. There is no evidence to indicate that the large increases in marginal holdings and agricultural land or households are direct results of the adoption of new technology or the trend toward mechanization on any significant scale. On the other hand, studies summarized by Parthasarathy (1979) show a varying impact of new technology on agrarian structure. Parthasarathy observed that "in relatively labour scarce Punjab, a profitable technology led to eviction of tenants, expansion in the size of the owner cultivated holding, growing landlessness and mechanization, and increased productivity without serious immediate tensions. Similar is the experience in the commercially advanced Gujarat state where the larger farmer is found to lease from the small farmer." In densely populated West Bengal and Andhra Pradesh, the new technology pushed owners toward cost sharing with tenants; although in Andhra Pradesh this was a transitional arrangement. As contract labour arrangements developed for peak operations, shared tenancy gave way to a nonmechanized, owner-cultivated larger farm. In semifeudal Orissa, sharecropping with small tenants continues, with added emphasis on an awareness for the purchase of new inputs. Parthasarathy (1979) stated that "undoubtedly, a superior technology has been a driving force to induce institutions to adapt themselves to its requirements."

Economically Viable Holdings

The new yield-increasing technology had the effect of reducing the size of an economically viable holding, i.e., the area required to meet the needs of an average household. Based on farm management data from the 1950s, Khusro (1969) estimated that the minimum economic size would be between 3 and 4 ha. In arriving at this estimate, Khusro established that 3 ha would be viable if optimum use was made of one pair of bullocks or optimum use was made of family labour. Four hectares would be required, however, to meet the needs of an average household with average land productivity. It was recognized that, in view of the major trends in agriculture toward more irrigation, double or multiple cropping, and the adoption of new technology based on high-yielding varieties and increased use of fertilizers, the essential requirements of plow unit, work unit, and income unit would gradually converge toward a general minimum of 2 ha. Recently, the National Commission on Agriculture estimated that, with irrigated holdings, 1 ha under double cropping of high-yielding paddy or maize followed by wheat would give farmers an income that would provide a nationally desirable minimum level of consumption. In rain-fed areas, the same level of income could be obtained with a holding of 2 ha, with land development, the application of improved technology, and the necessary physical inputs (National Commission on Agriculture 1976, Part I).

Three other observations are relevant. Firstly, despite a decrease in the number and area of large holdings, both owned and operational, the skewed nature of their size distribution persists. Secondly, although the size of an economically viable holding decreased, the number of small and marginal holdings less than

2 ha in size was 59 million in 1976/1977. Thirdly, with the increase in the number of marginal holdings, a larger proportion of the rural population had a land base, either owned or leased, that enabled them to meet part of their subsistence needs and also to become eligible for government assistance.

Irrigation

With respect to irrigation, small and marginal farmers are better off than medium and large farmers. The agricultural census, 1970/1971, revealed that 70.5% of the 12.4 million wholly irrigated holdings were less than 1 ha in size, whereas another 15.5% were between 1 and 2 ha (Table 4.8). The average area per wholly irrigated holding is 1 ha. Partly irrigated holdings comprise another 17 million, with an average irrigated area of about 1 ha. Thus, among irrigated holdings, small and marginal farms predominate. More than 31% of the net irrigated area occurs on small and marginal holdings, even though these holdings account for only 22% of net area sown. Nearly 34% of the area under marginal holdings and 28% of the area under small holdings is irrigated, whereas only 13% of the area under large holdings is irrigated (Table 4.9). This is an interesting feature from the point of view that, with irrigation, small and marginal holdings are potentially more productive. Also, cropping intensity is higher on marginal and small holdings, and the percentage of unutilized land is lowest (Table 4.10).

Fertilizer Use

The evidence relating the size of holding and fertilizer use is not clear-cut. A study on fertilizer use on selected crops, conducted by the National Council of

Table 4.8. Distribution of irrigated and nonirrigated holdings, all India, 1970/1971.

	Wholly irrigated		Partially irrigated			Nonirrigated	
Size of holding (ha)	Number ($\times 10^6$)	Area (Mha)	Number ($\times 10^6$)	Total area (Mha)	Irrigated area (Mha)	Number ($\times 10^6$)	Area (Mha)
<1	8.77	3.05	5.81	2.63	1.34	20.81	7.33
1–2	1.92	2.45	3.72	4.81	2.28	7.73	9.74
2–4	1.12	2.77	3.47	8.75	3.81	6.06	14.73
4–10	0.54	2.73	2.90	15.33	5.55	4.48	22.87
>10	0.09	1.14	1.05	14.75	3.85	1.62	22.74
Total	12.44	12.14	16.95	46.27	16.83	40.70	77.41

Source: Ministry of Agriculture and Irrigation (1975).

Table 4.9. Distribution of area under irrigation, 1970/1971.

Size of holding (ha)	Net irrigated area (Mha)	Percentage of total net irrigated area	Net area sown (Mha)	Percentage of total net area sown	Net irrigated area as a percentage of net area sown
<1	4.39	15.1	13.00	9.6	33.8
1–2	4.74	16.3	17.01	12.5	27.9
2–4	6.61	22.7	26.25	19.3	25.2
4–10	8.33	28.6	40.92	30.1	20.4
>10	5.04	17.3	38.64	28.5	13.0
Total	29.11	100.0	135.82	100.0	21.4

Source: Ministry of Agriculture and Irrigation (1975).

Table 4.10. Distribution of cropping intensity and unutilized land, all India, 1970/1971.

Size of holding (ha)	Gross cropped area (Mha)	Net area sown (Mha)	Intensity of cropping	Percentage unutilized land
<1	16.93	13.00	1.30	2.92
1–2	20.81	17.01	1.22	3.84
2–4	31.34	26.25	1.19	5.16
4–10	46.72	40.92	1.14	6.89
>10	42.26	38.64	1.09	12.67
Total	158.06	135.82	1.16	7.64

Source: Ministry of Agriculture and Irrigation (1975).

Applied Economic Research (1974a) from 1968/1969 to 1970/1971, showed that, for the country as a whole and for most crops, the proportion of gross cropped area fertilized per holding increased with farm size, but the intensity of fertilizer use per hectare of cropped area was greatest on small holdings. National sample survey data on the use of fertilizer on agricultural holdings did not indicate much variation in the amounts of fertilizers applied to different categories of holding nor any association between the size of holding and the rate of application of urea or ammonium sulfate in the case of irrigated rice and wheat (National Sample Survey Organization 1977). The share of small and marginal farms in total fertilizer was about 32%.

Credit Availability

To facilitate the adoption of new technology, the farmer requires credit to purchase inputs and for other cash expenditures. One of the underlying assumptions of the all-India credit review committee, which initially suggested the SFDA and MFAL programs, was that small farmers are handicapped when it comes to access to credit. Data on the distribution of institutional credit to farmers indicate that, in 1975/1976, farmers owning less than 2 ha of land received 33% of the total medium- and long-term credit given by commercial banks, cooperative societies, and land development banks. It may appear that this proportion is not inadequate in relation to the proportion of land owned by this category of farmers, i.e., about 24% in 1970/1971, according to the national sample survey. Commenting on this, the review committee on regional banks observed that "It is, however, possible that the data on borrowers' size of holdings with cooperatives may not be very accurate. We also learn from knowledgeable persons that there are a number of *benami* transactions under which bigger land owners borrow in the name of small farmers" (Reserve Bank of India 1978a). Even if the figure is correct, this share has to be examined in relation to their requirements for credit, particularly the low-cost credit provided by credit institutions. A study by the National Council of Applied Economic Research (1974b) showed that "whereas money lenders provided two-thirds of the total amount borrowed by small and marginal farmers, they were the source for only one-fourth of the amount borrowed by large farmers." Also, in 1977/1978, of the 17 million borrowers from the Primary Agricultural Credit Societies and Central Land Mortgage Banks, less than half owned 2 ha or less, although their share in the total number of ownership holdings was nearly three-quarters. Stated in a different way, of the 54 million ownership holdings less than 2 ha in size, only 8 million had access to cooperative credit.

Adoption Rates

Studies conducted by the Program Evaluation Organization, Planning Commission, did not show any bias, in terms of farm size, with regard to the adoption of high-yielding varieties of wheat in Punjab, although small farmers were a little slower in adopting the new varieties than the more progressive and innovative medium and large farmers. There is also evidence that, in general, small farmers participated in the high-yielding varieties program not only in areas where the technology spread rapidly but in other areas and for other crops with moderate adoption rates. However, for all five crops and in each of the years studied, a strong positive linear association was found between the proportion of farmers adopting high-yielding variety seeds and the size of the farm. Also, an inverse relationship was found between the intensity of adoption and farm size, with smaller farmers devoting a higher proportion of their sown crops to high-yielding varieties than larger farmers (Lockwood et al. 1971). Additional studies by Schluter and Mellor (1972) confirmed these conclusions.

Productivity per Hectare

A major question related to growth with equity is the relationship between farm size and productivity per hectare. Farm management investigations during the 1950s and early 1960s indicated that farm productivity was inversely proportional to size, using traditional technology. This relationship was first observed by Sen (1962, 1964), who attributed it to higher labour input and lower labour costs on small farms. Bardhan (1973b) disputed this explanation, whereas Khusro (1964) sought to explain the relationship in terms of inherent differences in soil fertility and land quality. Rudra (1968a,b) questioned the statistical methodology adopted and observed that this relationship was partly the result of aggregation and might disappear if ungrouped data were used. Bhattacharya and Saini (1972) and Rao (1966) also studied the question and found that size–productivity relationships were basically the same regardless of whether individual farm data or aggregate data were used. Some of these studies were summarized in Bachman and Christensen (1967), Bhagawati and Chakravarty (1969), and Kanel (1967). All these studies were related to the period before the green revolution.

During the period following the green revolution, Sidhu (1974) found that the technical efficiency of small and large farmers producing wheat was the same. Johl (1973) observed a positive relationship between size and productivity, whereas Rao (1975, pp. 143–145) showed that the inverse relationship between farm size and output per hectare weakened or disappeared. Roy (1974) found that the inverse relationship between farm size and production per net cropped hectare continued in Punjab on farms that used tractors as well as on those that did not. National Council of Applied Economic Research data from 1968/1969 to 1970/1971 also support this observation. A multiple-regression analysis showed that the inverse relationship between farm size and value of output per hectare held even after differences in land value were taken into account and that this relationship was still significant during the green revolution years from 1968/1969 to 1970/1971, although there was a moderate tendency for the relationship to weaken over time (Sanderson and Roy 1979). Lele (1974) also noted that, all things being equal, there was no evidence to indicate that small farms were less productive than large farms, but unless the package of inputs, credit, and extension reached both small and large farmers in a similar fashion, marginal productivity of capital on small farms might be lowered.

Thus, from the point of view of irrigation, cropping intensity, labour input per hectare, and land productivity per hectare, small and marginal farmers are not at a disadvantage. Even with regard to fertilizers and credit, in relation to the area accounted for by these farms, their share in total fertilizer use and institutional credit received is higher, showing that they are not discriminated against. It should be noted that the basic philosophy that led to the launching of the SFDA and MFAL programs was that the markets for inputs (particularly credit) were imperfect and nonneutral and that they discriminated systematically against small producers. Raj Krishna (1979) argued that although small farmers as a class commanded more productive assets and inputs per unit of land, because "they constituted around seventy percent of agricultural households, assets and input availability per household are less in the small farm sector, than in the large farm sector." Hence "the input per hectare has to be increased until the gain in productivity per hectare permits income per head to be raised to the poverty line or above it." Furthermore, although the share of small and marginal farmers in total institutional credit is higher than the area cultivated by them, the proportion of small and marginal farmers having access to credit is much smaller than that of large farmers. Hence, small and marginal farmers have to be assured of preferential access to these resources; simultaneously, other constraints to the adoption of new technology by them have to be removed.

Labour Use and Employment

Farm management studies have clearly indicated that the size of the farm has a negative relationship with the input of human labour per unit of land, which is attributable to an increase in the cropping intensity on small farms; the adoption of a more intensive cropping pattern; and an increased use of labour per hectare under individual crops (Mehra 1976).

Data on employment by size of holding on an all-India basis are not available; however, farm management data provide relevant information on family labour, attached labour, and hired labour. Of these, generally speaking, the number of permanent workers and hired casual labour per farm increases with size, as does the number of persons per household, although the increase may not be proportional to the size of the farm. Consequently, the number of persons per hectare decreases as the size of the farm increases (Table 4.11).

Regarding the effect of new technology on employment, Rao (1975) concludes that the green revolution, regarded as a package consisting of high-yielding varieties and fertilizers, has made a substantial contribution to employment. Also, irrigation, particularly through tubewells, contributed significantly to employment where partial use of tractors has been made. The displacement of labour through mechanization has been compensated for by the additional labour requirements of the new technology.

Table 4.11. Number of persons per household and per hectare.

Size of holding (ha)	Persons per household	Persons per hectare
<1	4.98	4.98
1–2	5.78	3.83
2–4	6.50	2.17
4–10	7.26	1.04
>10	8.20	0.82

Source: National Sample Survey Organization (1976).

Simultaneously with the popularization of high-yielding varieties, and to some extent promoted by it, a mechanical revolution began to take place, particularly in areas with irrigation facilities. The time interval between paddy harvest and wheat sowing was so small that without mechanized operations farmers could not grow two crops; however, mechanization and the shorter duration of the high-yielding varieties enabled farmers to grow two crops. Tractors and mechanical threshers were introduced on a very large scale in labour-scarce or high-wage areas of Punjab, Haryana, and Western Uttar Pradesh and on a smaller scale in other states. There were fears that unrestricted encouragement of mechanization would have adverse effects on employment. A number of diagnostic studies undertaken during the early 1970s clearly showed that mechanization accompanied by higher cropping intensity would not adversely effect employment. Mechanization of irrigation through tubewells actually increased employment, although it displaced bullock labour. On the other hand, introduction of harvest combines as a logical corollary to the introduction of tractors, threshers, and tubewells resulted in labour displacement. Thus, unrestricted mechanization does adversely effect employment and equity. Other studies on this subject have been conducted by Mettrick et al. (1978), Cline (1977), and Binswanger (1977).

Output and Income

Although small farmers are not at a disadvantage in terms of productivity per hectare, because of differences in resource endowments and relatively easy access to inputs and credit, growth of output was much faster on larger farms. The higher growth has been achieved through the use of capital inputs and the substitution of capital for labour. The sharp rise in income enabled the larger farmers to invest in irrigation and modern inputs. Increased irrigation led to the expansion of area under wheat in northwestern India, which, in turn, resulted in increased incomes.

A good proportion of the output of small and marginal farmers (particularly food grains) is consumed by the household. Consequently, the proportion of marketed output increases with the size of holding (Patnaik 1975).

There is also evidence to indicate that, because of their bargaining power and stock-holding capacity, owners of larger farms get higher prices than owners of smaller farms, who are often forced to sell their produce to intermediaries within the village at lower prices. Cash incomes of large farm owners, therefore, are relatively higher. These factors have contributed to widening income disparities between small and large farmers (Dantwala 1976). In some areas, however, where there has been a declining trend in the inequality among operated areas, income, as a whole, has been less unevenly distributed (Rao 1975, p. 150).

Wages

In areas where high-yielding varieties have been introduced, evidence shows that wages have risen, in general, especially those of seasonal workers. Bardhan (1970) suggested that "the so-called green revolution may not have helped in raising agricultural wage rates in real terms in Punjab (including Haryana and Himachal Pradesh); in fact there seems to be some fall in the real wage rates in many areas of the region" between 1960/1961 and 1967/1968. In a subsequent study, Bardhan (1973a) extended the comparison over a longer period (up to 1970/1971) and found that the initial decline was temporary and that there was

a rise after the mid-1960s. Reviewing available data, Vyas (1979b) concluded that "there is enough evidence to support the view that not only in Punjab but wherever the HYV program has spread in a measurable way, wages have moved in an upward direction." In another study covering the period 1956/1957 to 1971/1972, Jose (1974) showed that the real wages improved significantly not only in Punjab (including Haryana) and Kerala, but also in Tamil Nadu, Uttar Pradesh, and Gujarat. The study also revealed that interstate disparities in many wage rates tended to increase since 1964/1965. A definite link was also observed between fast growth and real wages as well as employment in several areas (Etienne 1980). Further studies on wage rates are described in Bardhan (1977).

Sharing of Benefits

With regard to the sharing of benefits from the new technology, Mellor and Lele (1973) have shown that, in a typical transfer of 4 ha from traditional to high-yielding varieties, 67% of the increased gross income is added payment to the family land and capital, 10% is the share of labour, and the balance represents the additional cost of fertilizer, seed, and other expenses. In another study, Rao (1975) showed that although the absolute share of hired labour in aggregate income rose, its relative share in output declined. Rao came to the conclusion that, although land-augmenting technological change by itself seemed to reduce the relative share of land more than that of labour, the relative share of hired labour in the large-farm sector declined more than that of land owing to mechanization, indicating the widening income disparities between the large landowner and landless labourer.

Thus, gains from the new technology were not confined to large farmers alone. Small and marginal farmers also benefited when they had access to the necessary resources of inputs and credit, although in absolute terms the gap between large and small farmers did, in fact, widen. Even landless labourers gained, in irrigated areas, in terms of additional employment and higher wages. Yet, the impact of these gains was not felt on the economy as a whole because the number of small farmers who had access to and utilized the productive resources was comparatively small. Institutional agencies, therefore, must strive to meet the full needs of the bulk of these farmers.

Special Programs

As noted earlier, it was recognized that the new technology might bypass small and marginal farmers and result in widening interpersonal disparities; therefore, special programs such as small farmers' development agencies and marginal farmers' development agencies were initiated during the Fourth Plan. These special programs were designed to enlarge the productive asset base of small and marginal farmers and to enable them to participate in the new technology by providing access to credit and input supplies. Existing employment and income-generating activities were to be made more remunerative, and new opportunities were to be provided through subsidiary activities such as dairy farming and raising poultry, pigs, sheep, and goats.

Evaluation studies carried out by the Division of Rural Surveys of the Reserve Bank of India (1975, 1976), Program Evaluation Organization of the Planning Commission (1979b), agroeconomic research centres, and other research institutions showed that, in general, the special programs failed to achieve their

goals. The reasons for this failure were many. During the initial years, the process of identifying beneficiaries was slow, in some cases partly due to the absence of land records. Lack of precision in defining target groups, varying norms for identification, and lack of supervision resulted in the inclusion in the program of persons not intended as beneficiaries. When the criterion was based on holding size, it was circumvented by including persons whose ownership holdings were within the prescribed limits but who had larger operational holdings, which gave them larger incomes. A similar case occurred with persons whose operational holdings were within prescribed limits but who had larger ownership holdings. The norms were fixed in terms of size without specifying whether the land was irrigated or nonirrigated. In some projects, the tenants were left out of SFDA completely because the majority of them had oral leases, and where tenancy arrangements were concealed their names were omitted from land records. Also, if the tenants were identified and their rights recorded, this might meet with opposition from the landlords. Farmers with land and income above the agreed upon limits managed to be included in the list of beneficiaries by conspiring with project authorities. The lists of beneficiaries were prepared from outdated land records; lands owned/cultivated outside the resident village were not considered. Even among the target groups, the programs tended to increase the incomes of better-off farmers. Because the initial objective of SFDA was to ensure the viability of potentially viable farmers, the larger of the small farmers benefited from the SFDA. Farmers with large nonfarm incomes were included in SFDA, whereas in many cases landless agricultural labourers were excluded from MFAL because selection was restricted to cultivating labourers only. Some of these deficiencies have been removed, however, through a more precise definition of the beneficiaries and by laying down standard criteria and procedures for their identification.

There were other weaknesses in the implementation of the programs. Subsidies were provided to small and marginal farmers for purchase of inputs to reduce the cost of adopting input-intensive technology; funds were also provided to cover risks and management costs of cooperative credit institutions to induce them to supply more credit, but experience shows that there is need for other kinds of intervention also (Desai 1979). In many of the project areas, the cooperative infrastructure continued to be weak. As a result, identified beneficiaries could not obtain credit. Several of the projects studied by evaluation agencies did not have a specific program for supplying inputs. Cases of improper use of loans and subsidies were also detected in many of the projects due to a lack of supervision. Minor irrigation programs did not make much headway where adequate staff was not posted at the project or block level. In some areas, returns from irrigation schemes were low because of a lack of extension support. The program for constructing small tubewells (through loans to farmers) was unrealistic because it benefited large farmers only.

The subsidiary-activities programs require supplies of improved livestock and poultry; adoption of improved feeding and management practices; availability of appropriate veterinary and disease prevention facilities; and arrangements for marketing, transport, and storage as a package. Evaluation studies showed instances where loans were given to individuals for the purchase of dairy cattle without making arrangements for marketing the milk. In other cases, supplies of improved livestock and poultry were inadequate. Furthermore, where requisite veterinary services were not available, many animals and birds perished or became unproductive. In such cases, where essential elements of the package were missing, the programs became a liability to the farmers.

Coverage of the programs is also inadequate. Even after the SFDA program is extended to 168 districts and the full complement of 70 000 small and marginal farmers envisaged in each project is fully covered, the program will benefit only approximately 12 million families, which form between one-fifth and one-sixth of the target groups. The districts selected for SFDA are not necessarily those where the new technology has been introduced. Hence, these programs will not benefit small and marginal farmers in such districts. (Even where the districts are the same, crop production and subsidiary-activity programs are not integrated at the farmer's level.) Furthermore, although various measures were envisaged to overcome institutional and infrastructural disabilities, in actual practice these difficulties were more formidable than originally anticipated and required action outside the jurisdiction of the agencies. For example, in the case of loans for the purchase of milch animals, the additional income will accrue to the farmer only when adequate arrangements are made for marketing the milk. Thus, the experiment of superimposing additional equity-oriented programs to enable small and marginal farmers to participate in the process of growth did not succeed in achieving its goals.

On the positive side, the PEO data reviewed by Raj Krishna (1979) showed that, in the 34 projects studied, assistance under the scheme generated an additional annual income of Rs1017 per beneficiary family in 1973/1974. Minor irrigation assistance yielded Rs1670 and dairy assistance Rs829 as extra income per household. Raj Krishna concluded: "Whenever irrigation and dairy assistance is given with access to technical help and marketing, increases in incomes of the order of 75 to 300 percent have been achieved, and the beneficiaries have either crossed or risen close to the poverty line. . . . These results have validated the essential concept of the SFDA scheme that small households can be relieved of poverty if production assets are delivered to them and their new activities are linked with support systems. The main problems which then need to be attended to are problems of inadequate coverage, administrative apathy and laxity, and the failure to organize support activities." These deficiencies need to be removed and coverage of the programs enlarged.

Interregional Disparities

In a large country like India, it is natural that wide interregional disparities arise out of the inherent differences in resource endowments (i.e., land and water) of different regions and the extent to which potential resources are utilized. Amounts of rainfall and its distribution are unequal in different areas. There are also inherent differences in slope, composition, and texture of soils. Superimposed on these differences are different levels of infrastructural development, which are due to historical reasons, demographic pressures, and economic and social factors. Because the new technology has, so far, been confined largely to irrigated and assured-rainfall areas and requires good infrastructural development to facilitate input distribution and output marketing, interregional disparities were accentuated during the period following the green revolution.

Rainfall

On the basis of aggregate rainfall, the country can be divided into three categories: low (<750 mm), medium (750 – 1150 mm), and high (>1150 mm) (Table 4.12). About one-third of the net area sown falls under each category.

Table 4.12. Percentage area under different rainfall regimes.

	Rainfall (mm)		
	Low (<750)	Medium (750–1150)	High (>1150)
Gross cropped area	32.8	35.8	31.4
Net area sown	33.9	35.6	30.5
Net irrigated area	34.1	41.3	24.6
Percentage net irrigated to net sown area	22.9	26.4	18.3

Source: Ministry of Agriculture and Irrigation (1978).

However, a larger proportion of the net irrigated area is situated in the medium-rainfall region.

Irrigation and Fertilizer Use

Although, in 1976/1977, 25.8% of gross cropped area was irrigated at the all-India level, the percentage of irrigated area varied from 9.8% in Madhya Pradesh to 80.8% in Punjab[2] (Table 4.13). Fortunately, there is still scope for increasing the irrigated area in some of the states where the existing percentage is low, e.g., Assam, Bihar, Kerala, Madhya Pradesh, and Orissa (Table 4.14). The use of fertilizer per hectare, in terms of plant nutrients, varies from 1.9 kg in Assam to

Table 4.13. Irrigated area under crops and use of fertilizer per hectare of gross cropped area, major states.

State	Percentage irrigated area under all crops to gross cropped area, 1976/1977	Fertilizer use (NPK) (kg/ha) 1977/1978
Andhra Pradesh	35.0	39.4
Assam	17.3[a]	1.9
Bihar	31.8	16.0
Gujarat	13.5	34.1
Haryana	51.1	38.9
Himachal Pradesh	16.7	10.8
Jammu and Kashmir	40.6	13.8
Karnataka	14.9	24.4
Kerala	12.7	25.9
Madhya Pradesh	9.8	7.8
Maharashtra	11.2	18.5
Orissa	19.2	9.0
Punjab	80.8	76.7
Rajasthan	17.6	7.1
Tamil Nadu	42.0	64.1
Uttar Pradesh	42.1	37.7
West Bengal	20.2[b]	22.4
All India	25.8	26.2

Sources: Ministry of Agriculture and Irrigation (1978a); Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics (1980).

[a]Refers to 1953/1954.

[b]Refers to 1967/1968.

[2]In the analysis discussed here, states have been considered as units. It is clear, however, that a state is not homogeneous with regard to resources and that there are large variations within states among different subregions. The National Commission on Agriculture attempted to classify the country into homogeneous agroclimatic regions, which would form a basis for detailed land-use and crop planning.

Table 4.14. Irrigation schemes: ultimate potential and utilization up to 1977/1978.

State	Major and medium irrigation (Mha)		Minor irrigation (Mha)		Percentage utilization to ultimate potential
	Ultimate potential	Utilization[a] up to 1977/1978	Ultimate potential	Utilization[a] up to 1977/1978	
Andhra Pradesh	5.00	2.78	4.20	1.88	50.7
Assam	0.97	0.06	1.70	0.29	13.0
Bihar	6.50	2.30	5.90	2.10	35.5
Gujarat	3.00	0.96	1.75	1.36	48.7
Haryana	3.00	1.71	1.55	1.18	63.4
Himachal Pradesh	0.25	—	0.29	0.09	17.0
Jammu and Kashmir	0.25	0.10	0.55	0.31	51.8
Karnataka	2.50	1.01	2.10	0.93	42.0
Kerala	1.00	0.43	1.10	0.32	35.6
Madhya Pradesh	6.00	1.26	4.20	1.40	26.0
Maharashtra	4.10	1.12	3.20	1.51	36.0
Orissa	3.60	1.33	2.30	0.52	31.3
Punjab	3.00	2.25	3.55	2.83	77.6
Rajasthan	2.75	1.38	2.40	1.76	60.9
Tamil Nadu	1.50	1.18	2.40	1.89	78.7
Uttar Pradesh	12.50	5.47	13.20	7.59	50.8
West Bengal	2.31	1.42	3.80	1.30	44.5
All India[b]	58.48	24.77	55.00	27.30	45.9

Source: Planning Commission (1979a).
[a]Includes preplan schemes.
[b]Includes other states and union territories.

76.7 kg in Punjab (Table 4.13), with an all-India average of 26.2 kg/ha. In Punjab, Haryana, Tamil Nadu, Uttar Pradesh, and Andhra Pradesh, both the proportion of irrigated area and fertilizer use per hectare are high. Although the percentage irrigation in Gujarat is low, fertilizer use is relatively high, perhaps because of its use for commercial crops. A district-level study undertaken by Desai and Singh (1973) showed that, in 1968/1969, less than 15% of the districts accounted for 80% of the total fertilizer use in the country, whereas more than 50% of the districts accounted for only 10% of the fertilizers used during the year. Even in 1974/1975, a little over one-third of the total number of districts accounted for about 80% of fertilizer use within the country.

Credit Supply

The distribution of agricultural credit from both cooperatives and commercial banks is considerably skewed. Punjab and Haryana lead in per capita credit, and Kerala and Tamil Nadu in credit per hectare. Bihar, Orissa, West Bengal, Madhya Pradesh, and Rajasthan receive the least credit. Table 4.15 gives an indication of the need to reduce interstate disparities in credit availability, an important prerequisite to the adoption of new technology.

Electricity Supply

Electricity must be readily available in rural areas to accelerate programs for groundwater exploitation. It also promotes the development of rural industries, agricultural processing, dairy and poultry production, and storage of perishable products. Table 4.16 shows the disparities between different states with regard

Table 4.15. Distribution of agricultural credit, 1976/1977.

State	Total institutional credit (Rs × 10^7)	Credit per capita (Rs)	Credit per hectare (Rs)
Punjab	143	139	238
Haryana	110	133	214
Tamil Nadu	233	81	305
Karnataka	174	78	160
Gujarat	145	76	143
Maharashtra	243	70	125
Andhra Pradesh	225	64	170
Kerala	113	63	376
Rajasthan	89	42	50
Madhya Pradesh	117	34	55
Uttar Pradesh	227	30	99
Himachal Pradesh	8	26	91
Orissa	50	25	68
West Bengal	65	20	88
Bihar	55	11	51

Source: Reserve Bank of India, Bombay, India.

Table 4.16. Percentage of villages that have electricity and the number of irrigation pumpsets/tubewells that are electrified (March 1978).

State	Villages with electricity (%)	No. of irrigation pumpsets/tubewells electrified (× 10^3)
Haryana	100.00	167
Punjab	100.00[a]	197
Tamil Nadu	98.65	810
Kerala	96.53	59
Maharashtra	60.04	489
Karnataka	56.51	262
Andhra Pradesh	53.73	329
Gujarat	44.44	156
Uttar Pradesh	31.12	299
West Bengal	30.65	20
Orissa	30.13	6
Rajasthan	30.02	128
Bihar	26.94	140
Madhya Pradesh	23.07	216
Assam	9.89	1
All India	37.65	3041[b]

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. Indian agriculture in brief. 18th ed.

[a]Refers to inhabited villages.

[b]Includes other states and union territories.

to the percentage of villages that have electricity and the number of irrigation pumpsets/tubewells that are electrified.

Crop Yields and Growth Rates

Differences in the use of irrigation and fertilizer are reflected in crop yields (Table 4.17) and rates of growth in production observed in different states (Table 3.4). In general, the highest average yields are three to five times larger than the lowest yields for the various crops.

Table 4.17. Highest and lowest crop yields (average 1976/1977 to 1978/1979).

Crop	Highest yield		Lowest yield	
	Average (kg/ha)	State	Average (kg/ha)	State
Wheat	2562	Punjab	632	Karnataka
Rice	2834	Punjab	759	Madhya Pradesh
Maize	2869	Karnataka	758	Uttar Pradesh
Sorghum	954	Tamil Nadu	167	Haryana
Gram	873	Haryana	317	Andhra Pradesh
Cotton	349	Punjab	76	Madhya Pradesh
Groundnut	932	Gujarat	574	Madhya Pradesh
Sugarcane (cane)	99374	Tamil Nadu	29782	Madhya Pradesh

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics (1980).

Table 4.18. Output differentials by irrigation intensity, 1969/1970.

State	District	Percentage irrigation	Gross value of output per hectare (Rs)
Haryana	Ambala	20–30	1500
Madhya Pradesh	Balaghat	20–30	751
Uttar Pradesh	Bareilly	20–30	909
Punjab	Hoshiarpur	30–40	1010
Uttar Pradesh	Varanasi	30–40	715
	Deoria	30–40	988
Haryana	Rohtak	40–50	1200
Uttar Pradesh	Mathura	40–50	814
	Azamgarh	40–50	767

Source: National Commission on Agriculture (1976, Part II, p. 47).

Even among districts having comparable irrigation and distribution of rainfall, cropping intensity, cropping patterns, and soil fertility ratings, there are considerable differences in terms of output her hectare (Table 4.18).

In general, where irrigation and electricity are well developed and institutional arrangements for supplying inputs, credit, and marketing are better organized, the adoption of new technology has resulted in faster growth, thereby widening interregional disparities.

National Product

Interstate variations in area and productivity of different crops are reflected in the national product from agriculture and allied sectors, as well as in the total income for all sectors. Table 4.19 shows the wide differences in the relative indices of per capita product. Although the coefficient of variation of total per capita product showed a slight increase between 1960/1961 and 1975/1976, the interstate disparity with respect to agriculture's contribution almost doubled during this period.

Levels of Agricultural Development

Comparative levels of agricultural development in different states are presented in Table 4.20, which gives the per capita and per hectare value of output of food grains and major commercial crops. There is no direct relationship be-

Table 4.19. Per capita product (index with average for states = 100), 1960/1961 and 1975/1976.

State	1960/1961		1975/1976	
	Agriculture and allied sectors	Total of all sectors	Agriculture and allied sectors	Total of all sectors
Andhra Pradesh	92.7	96.4	95.4	90.6
Assam	109.6	100.3	99.8	86.6
Bihar	70.6	66.6	70.1	67.6
Gujarat	100.0	118.4	100.7	124.8
Jammu and Kashmir	104.5	87.0	96.5	83.3
Karnataka	97.2	91.9	105.7	104.8
Kerala	97.7	94.9	99.1	101.0
Madhya Pradesh	95.5	85.8	90.8	79.8
Maharashtra	93.2	141.3	89.5	147.0
Orissa	106.2	83.1	115.3	84.2
Punjab[a]	140.1	133.7	186.0	157.1
Rajasthan	95.5	80.4	107.6	88.2
Tamil Nadu	85.9	100.6	71.8	100.7
Uttar Pradesh	114.7	89.5	83.8	73.4
West Bengal	97.7	140.1	89.3	111.1
Average (Rs at current prices)	177	332	458	990
Coefficient of variation	14.6	22.1	25.8	24.9

Source: Planning Commission (1979a, p. 197).

[a]Data for 1960/1961 are for the states of Punjab and Himachal Pradesh and for 1975/1976 for the then states of Punjab, Haryana, and Himachal Pradesh.

Table 4.20. Levels of agricultural development, 1977/1978.

State	Value of food grains and main commercial crops in 1977/1978 at 1976/1977 prices (Rs)	
	Per capita of rural population	Per hectare
Punjab	1779	3361
Haryana	1172	1990
Gujarat	775	1723
Karnataka	665	1584
Maharashtra	630	1189
Tamil Nadu	601	2516
Uttar Pradesh	573	1777
Rajasthan	568	888
Madhya Pradesh	538	949
Andhra Pradesh	487	1501
Orissa	421	1207
West Bengal	409	1870
Bihar	286	1314
Himachal Pradesh	—	1488
Jammu and Kashmir	—	1703
Assam	—	1373
Kerala	—	2014

Source: Planning Commission (1979a, p. 198).

tween the two parameters because the density of rural population varies from state to state. Tamil Nadu, Uttar Pradesh, West Bengal, and, to some extent, Andhra Pradesh have high levels of productivity per hectare but relatively low levels of per capita output. Among the low productivity states, per capita output

is relatively high in Maharashtra, Madhya Pradesh, and Rajasthan. In Bihar, per capita productivity is very low because of high population density and low productivity per hectare. However, the irrigation potential yet to be created in this state is relatively high (Table 4.14).

Institutional Reform

The poor performance of agriculture in parts of eastern India is often attributed to patterns of land tenure and tenancy and inadequate development of institutional credit in that region. After analyzing the regional pattern of agricultural growth in India, Dantwala (1978) concluded: "On a preliminary view, neither land tenure nor institutional credit appears as the decisive factor which could explain differential growth within or between the regions of India." In support of this statement, Dantwala referred to the vastly different growth rates in Gujarat and Maharashtra even though they had identical tenurial conditions and highly developed cooperative credit structures. Also, in Andhra Pradesh and Maharashtra, which had medium to high levels of institutional credit, growth rates of agricultural output were disappointing. Dantwala clarified that his intention was not to underrate the importance of land reforms, particularly the elimination of absentee landlordism, ceilings on excessive ownership, abolition of sharecropping, and consolidation of holdings not only on the grounds of equity but also for augmenting production. Even so, Dantwala concluded that the data cited by him did not support the view that "participation in the modernization process is usually greater in regions which have shed the feudal and semi-feudal structure though on a-priori grounds it should be so."

Interregional disparities can never be eliminated in the sense that the natural endowments of different areas can never be made equal. Even after full development of irrigation potential, only 50% of gross cropped area can be irrigated by the year 2025. However, the existing disparities can be reduced if a technology suitable to dry areas can be evolved. In addition, some of the adverse effects of farming under rain-fed conditions can be mitigated through adoption of soil and moisture conservation practices. The incomes of people in semi-arid and arid areas can be improved by adopting silvipastoral systems suited to these areas. In fact, it is in recognition of these factors that the government started special area programs such as drought-prone area programs and hill and tribal area programs. These programs, however, have not been able to make any visible impact on the overall situation because the financial allocations made were small relative to needs, progress in implementing the programs has been poor, and there is still no suitable technology for adoption in dry areas.

At first sight, the command-area development program, which aims at making the most efficient use of water in the irrigation system, may appear to run counter to the equity policy because it invariably results in widening interregional disparities. However, even this program has some favourable impact on equity because fuller use of water leads to intensive and multiple cropping, thereby increasing demand for labour and employment opportunities on a continuing basis in areas irrigated under the projects.

5. Conflicts Between Growth and Equity

Given the twin objectives of growth and equity, various options are available, in terms of policy instruments and measures, to attain these objectives. However, some of the policy options may have implications for growth and equity that are partly or wholly in conflict and that need to be reconciled before a consistent set of agricultural policies can be formulated.

Two Dimensions of Equity

In considering growth–equity conflicts, one must keep in mind two related dimensions of equity: (1) a substantial reduction in the gap between income levels of the rich and the poor and (2) improvement in the income levels of the poor so that they can have a reasonable standard of living. The impact of growth, based on technological change, is different on each dimension depending upon its magnitude and pattern and the nature of the technology. A rapid growth rate in agricultural production, if it can be sustained through adequate domestic demand or exports, will result in greater equity because of its direct and indirect effects on employment and incomes and availability of cheaper food. The surpluses provide more capital for industrial development and for building up rural infrastructure. Where the growth rate is low or even moderate, these indirect benefits will be small. In either case, as long as the distribution of landholdings is skewed and if the pattern of growth and the technology adopted favour large and medium farmers and are confined to irrigated and infrastructurally well-developed areas, interpersonal and interregional disparities will be widened and will adversely affect equity. At the same time, because the new technology based on high-yielding varieties is neutral to scale, where institutional infrastructure facilitates its adoption by small and marginal farmers, their incomes and consumption will improve, thus contributing to greater equity, although in absolute terms the disparity between rich and poor may widen. Furthermore, adoption of labour-intensive technologies, as in the case of animal husbandry and poultry farming, would increase rural employment opportunities and contribute to greater equity. Thus, there will be no conflict between equity (in the sense of increasing income levels of small and marginal farmers) and growth if small and marginal farmers are given the opportunity to adopt new technology.

Production Strategy

Agricultural production strategies adopted during the 1960s under the intensive agricultural programs and high-yielding varieties program, however, resulted in widening interregional and interpersonal disparities. Thus, the intensive agricultural district program envisaged "undertaking of agricultural programs on a more intensive scale. . .in fifteen districts, in which conditions were specifically favorable on account of the availability of irrigation and assured

rainfall" (Planning Commission 1961, p. 306). The intensive agricultural area program, introduced in 1964/1965, concentrated on specific crops. The high-yielding varieties program also sought "optimum production. . . as a matter of deliberate policy in the best endowed and most promising areas" (Planning Commission 1969, p. 106). At that time, the pressing need was for a rapid increase in food grain production in response to an acute food situation and large food grain imports from abroad.[1] Because the available technology was suitable only for irrigated and assured-rainfall areas, and not for areas with low or uncertain rainfall, it was thought that by concentrating efforts in favourable areas the objective of rapid growth in food grains could be achieved in the shortest period of time. In retrospect, given the severity of the food crisis that led to the adoption of the new strategy, this policy, although obviously inequitable, seems to be justified.

During the initial years of intensive agricultural programs and high-yielding varieties programs, extension efforts were directed toward the progressive farmers, who also had the medium- to large-sized farms. These farmers were more innovative, had greater resources and were capable of taking risks, and took maximum advantage of extension efforts, input supplies, and credit. Rapid increases in food grain production on large and medium farms led to relatively larger increases in marketable surpluses that could be procured by the government. This additional procurement resulted in reduced imports, meeting commitments under the public distribution system, and building up stocks. In fact, Indian food imports were reduced and even eliminated in recent years, largely as a result of wheat and rice surpluses in Punjab and Haryana, which were reflected in additional procurement.

This is not to suggest that the new strategy bypassed small and marginal farmers. As discussed earlier, these farmers also participated in the programs, although in some areas they were comparatively late in adopting the new technology. An increase in food grain output by these farmers would reduce their demand for grains in the market but would not reduce the commitments under the public distribution system where it did not extend to rural areas. Furthermore, more balanced growth in production may reduce the dependence of deficient states on allocations of food grains from the national pool. Past experience has shown, however, that increased procurement from the larger production in surplus states will be much higher than the decrease in allocations to deficient states that is likely to result from a similar magnitude of production increase (Table 5.1). Thus, in the context of the narrow definition of self-sufficiency, the policies adopted during the 1960s, although they resulted in widening disparities, seem to have been justified at the time.

Having attained the self-sufficiency objective, it would now be desirable to place greater emphasis on growth of output and income of small and marginal farmers so that they could increase their consumption. Two other observations are relevant in this context. First, apart from the achievement of national self-sufficiency, the greater availability of food grains from domestic production had a positive effect on equity insofar as the rise in food grain prices was contained, particularly during the years 1973–1977. Second, the special equity programs designed to facilitate the participation of small and marginal farmers, initiated

[1]Imports of food grains averaged 5×10^6 t/year between 1961 and 1965. In 1966 and 1967, the average imports nearly doubled.

Table 5.1. Production and procurement/distribution of food grains ($\times 10^3$ t), 1967–1969 and 1974–1976, selected states.

	Production			Procurement/Distribution[a]		
	Average 1967–1969	Average 1974–1976	Difference	Average 1967–1969	Average 1974–1976	Difference
Surplus states						
Punjab						
Rice	404	1272	868	266	1208	942
Wheat	3455	5423	1968	1267	2129	862
Total food grains	5292	8171	2879	1722	3350	1628
Haryana						
Rice	258	519	261	167	398	231
Wheat	1347	2064	717	181	530	349
Total food grains	3190	4072	882	362	934	572
Deficit states						
West Bengal						
Rice	5427	6403	976	458	516	58
Wheat	139	885	746	1131	1151	20
Total food grains	6093	7782	1689	1649	1678	29
Kerala						
Rice	1203	1319	116	706	754	48
Wheat	—	—	—	375	337	−38
Total food grains	1230	1340	110	1081	1092	11

Source: Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. Bulletin on Food Statistics, 1970, 1971, 1976, and 1978 issues.

[a]Procurement data refer to surplus states; distribution data refer to deficit states.

in the early 1970s, could not have been started earlier unless the prospects for increased food grain production were bright.

Another consequence of the emphasis on small farmer oriented growth is that larger farmers are known to employ hired labour to a greater extent than small farmers, and, hence, large farmer oriented strategy would increase employment opportunities to the landless, whereas the small farmer oriented strategy would provide fuller employment to unemployed and underemployed family labour. In the long run, it would be desirable to adopt the small farmer oriented strategy and provide alternative employment opportunities to the landless.

Use of Irrigation Facilities

There are some programs, such as the provision of irrigation facilities, that are designed to promote both growth and equity; in actual field implementation, however, conflicts may arise unless special steps are taken to prevent them. For example, surface irrigation schemes are area based and both large and small farmers should receive the benefits equitably within the command area of the source of irrigation. The National Commission on Agriculture (1976, Part II, p. 43) observed: "but there are difficulties in ensuring proper utilization of water. In some of the irrigation systems, a substantial part of the available water is pre-empted by the large farmers with the result that the small farmers often go without water." A study of the economic benefits in the Kosi command area revealed that large farmers were able to appropriate a larger share of the water than small farmers (Prasad 1972, p. 16). Also, in the field-to-field system of irrigation, the small farmers at the end of the system do not receive their share of water, whereas the large farmers at the head of the system tend to overirrigate their fields and waste water, a tendency that is not discouraged because of the low irrigation

rates for surface water. Thus, small farmers are denied their share of water or receive it too late. This situation needs to be remedied through greater control and supervision of the distribution system.

In the exploitation of groundwater, the larger farmers, with their easier access to institutional credit and political influence, preempt the available water.[2] On the other hand, the individual small farmer, with a fragmented holding, may not be able to fully utilize the water available from an individual well or small tubewell; hence, small farmers need to be organized into groups to enable them to avail themselves of group loans from institutional sources to finance the construction of community wells. When the emphasis was on rapid growth, the adverse effects of the groundwater exploitation programs on equity were ignored. When these were recognized, measures to promote the construction or operation of small irrigation projects, such as small tubewells and community wells, and to make water available to small farmers on a priority basis were initiated by the government either departmentally or through government-sponsored agencies such as minor irrigation corporations; the progress of these efforts, however, was slow.

The question, therefore, is whether or not large and medium farmers should be prevented from exploiting irrigation sources. If this is done, it may result in slowing down or even halting the progress of minor irrigation schemes. This is an area of direct conflict between growth and equity that has to be considered carefully. Programs benefiting small farmers should be expedited and, in any case, no concessional financing should be made available to large farmers.

Fertilizer Use

Promotion of fertilizer use by small farmers through appropriate institutional supply and distribution arrangements does not involve any conflict between growth and equity. However, in a situation where fertilizer supplies are limited, intensive use of fertilizers in areas of high productivity at the expense of backward areas, although favouring rapid growth, would result in widening interregional disparities. If left to normal trade channels, the fertilizer distribution system would favour areas of intensive fertilizer use only. Sales to a smaller number of large and medium farmers in and around the depots would reduce the unit costs and, for a given price structure, maximize profits to the trade. The infrastructure, in terms of roads and other means of communication, is poor, particularly in rain-fed areas. In the absence of pressure from the supply side, the trade will not extend the distribution network to these outlying areas. Hence, in the draft of the Sixth Five-Year Plan, the government advocated "optimization rather than maximization of fertilizer dosage to enable extensive use at a lower dose to cover larger farming areas and farming populations," lessening of "spatial concentration" and "promotion of increased fertilizer consumption in areas of low growth" (Planning Commission 1979a, p. 267). This would involve extension of supply and distribution arrangements in these areas, which should be organized by the government, through cooperative or other agencies, and backed by adequate pressure of supplies from domestic production and imports.

[2]In one study, it was found that, in the Kosi region of Bihar, the number of tubewells (masonry and bamboo) increased from a mere 300 in 1965/1966 to 23 000 in 1972/1973 but more than half of the investment in this expansion was made by farmers with holdings of 8 ha or more; the share of farmers holding less than 2 ha was negligible (Clay 1975).

Unrestricted Mechanization

Nowhere is the conflict between growth and equity greater than with regard to some types of mechanization, particularly in a labour-abundant economy. Mechanization of irrigation operations, through installation of pumpsets and tubewells and the use of electricity for irrigation, results in improved technical efficiency and increased employment. As discussed earlier, in labour-scarce and high-wage areas, tractor cultivation enables more intensive cropping, does not reduce the overall human labour requirement, and leads to timely agricultural operations over a large area. As long as mechanization does not lead to the displacement of labour, it should be generally acceptable. Efforts should be made, therefore, to ensure that incentives such as cheap credit, tariff exemptions, overvalued exchange rates, and wage rates that are high relative to the opportunity cost of labour do not encourage replacement of labour by machinery, particularly in labour-surplus areas. Selective mechanization, where required to increase output, is, in fact, desirable. Improvement in the efficiency of agricultural implements that enable precision farming (e.g., adoption of seed–fertilizer drills) and reduce the tedium of labour does not conflict with equity.

Growth and Stability

Another related issue is the conflict between growth and equity. Food grain production in India before Independence was stagnant but stable. This was perhaps because of the absence of measures for accelerating growth and the implicit preference for stability even though this might lead to slow growth. For instance, in northern India the irrigation schemes aimed at providing security against drought and were not designed for producing optimum yields. Plant-breeding programs, in the past, also emphasized drought- and pest-resistant characteristics in the seed varieties in preference to high but variable yields. After the adoption of the new strategy both of these policies were modified. Increased irrigation, particularly from groundwater exploitation, e.g., tubewells, imparts greater stability to yields. Increased use of fertilizers and high-yielding varieties that are not pest and disease resistant, on the other hand, introduces an element of instability in crop yields.

Even before the introduction of the new strategy, Sen (1967) showed that there was a tendency for an increase in the rate of growth to be accompanied by an increase in instability, especially if the growth came about mainly as a result of increases in acreage and inputs, e.g., fertilizers, rather than improvements in skills, unless corrective action was taken simultaneously. If it is accepted that rapid growth increases instability, the policy option that is open is to introduce some kind of crop, credit, or input insurance on an individual or area basis to safeguard the interests of farmers, particularly small and marginal farmers.

Incentive Policies

With regard to incentive policies, there are three issues that have implications for growth and equity: remunerative price policies, input subsidies, and subsidized interest rates. The importance of assuring remunerative prices to farmers for increasing their production cannot be overemphasized. Without incentive prices, production suffers. At the same time, "high" incentive prices benefit only the holdings with a marketable surplus. Marginal farmers and agricultural la-

bourers who have to depend upon market purchases to supplement their production or wages in kind always favour lower prices. Here then is a conflict between giving farmers a higher incentive price and maintaining a lower price to enable the supply of cheaper grains to the vulnerable sections of the population. This conflict can be resolved through subsidizing the supply of grains to these sections of the population. This subsidy has to come from general tax revenues and may be at the expense of some development expenditure, which has to be foregone. Also, there are limits to the extent that high prices alone can act as an incentive to increase production. There is a view that increases in output and farmers' income will have to be brought about mainly through technological improvements and the availability of inputs, rather than price manipulation (National Commission on Agriculture 1975). Increases in production resulting from higher productivity would result in lower unit costs of production, which if reflected in output prices would help lower income classes more than upper income groups in terms of real income. Thus, a policy of remunerative support prices adjusted for variations in input costs is recommended.

Another practical issue that faces policymakers is whether to subsidize agricultural inputs or compensate for increases in input costs by raising output prices. Input subsidies are often favoured because they tend to reduce the cost and increase the profitability of the practice; hence, they are believed to lead to more rapid adoption of technology and, consequently, to result in higher production. An input subsidy is also recommended as an alternative to higher output prices because the additional income generated by higher prices may or may not be invested in modern agricultural practices and the higher prices could adversely effect the real incomes of the urban and rural poor as well as contribute to inflationary pressures. Selective use of subsidies could be made, however, restricting their application to certain new inputs and practices (to be phased out once they become popular), crops, sections of the population, or backward and inaccessible areas. In actual practice, however, very few input subsidies have succeeded in achieving their objective. In many cases, they do not reach the right people. Once introduced, it is difficult to withdraw them. Moreover, subsidies obscure the real contribution of an input toward raising production, and may result in subsidizing uneconomic inputs or practices, thereby resulting in misuse or misallocation of resources. Thus, input subsidies should, by and large, be avoided and existing subsidies should be phased out.

Institutional credit for agriculture has been subsidized in India mainly to encourage farmers, in general, and small farmers, in particular, to avail themselves of credit, which is basic to the adoption of improved agricultural practices in order to become more productive. Differential interest rates can also be treated as an instrument for transferring income to low-income groups, thus helping to redistribute income. The arguments against low interest rates for agricultural credit are many and include: subsidized credit for small farmers often results in leakages, it is open to corruption and political abuse, it can distort use of resources. Also, credit availability may be restricted because of limitations on the availability of money for meeting the subsidy cost (World Bank 1978). The fact that small farmers obtain a significant proportion of credit from moneylenders shows that timely availability of adequate credit is more important than the rates charged. On the other hand, those who argue for low interest rates relate the low rates charged for loans to the development of small-scale industries. Thus, decisions on interest rates for agriculture cannot be taken in isolation. There is a strong case for providing credit at subsidized interest rates to small and marginal farmers, mainly to encourage them to adopt the new capital-intensive technol-

ogy. Greater supervision, however, is necessary on the utilization of credit to prevent leakages and corruption.

Thus, remunerative support prices for crop output, adjusted for variations in input costs; phasing out of input subsidies; and differential interest rates favouring small and marginal farmers assist in the achievement of growth and equity.

The strategy to be adopted for agricultural production should consider the trade-off between growth and equity, give an equity orientation to measures aimed at growth, and adopt programs for securing equity without sacrificing growth. Thus, the rapid growth-oriented irrigation and high-yielding varieties programs can be implemented in such a way that small and marginal farmers participate in them and share in the benefits, thereby promoting equity. Equity-oriented programs for the development of subsidiary activities also contribute to rapid growth. Thus, in these instances there is no conflict between growth and equity. The production strategies implemented during the 1960s resulted in widening disparities between different regions and different classes of farmers. In retrospect, given the severity of the food crisis that led to the adoption of the new strategy in the mid-1960s, even this policy of concentrating efforts in favourable areas seems to be justified. With the immediate objective of achieving self-sufficiency in food grains having been achieved, adoption of small farmer oriented growth strategy is now called for and is, in fact, one of the essential elements required for realizing the welfare objectives of the five-year plans. Unrestricted mechanization involving displacement of labour in labour-surplus areas should be discouraged and the policy of selective mechanization should be encouraged. Incentive policies adopted should be conducive to realizing growth with equity.

6. Agricultural Strategy for Growth with Equity

The approach to economic development objectives in developing countries has undergone several changes during the last three decades. During the early 1950s, the focus was on rapid growth, in terms of gross national product or increasing aggregate supply. It was assumed that the benefits would trickle down to the less fortunate, solving poverty and income distribution problems, if growth rates were fast enough. It was even thought that redistribution in favour of the poor would automatically reduce savings, weaken incentives, and impair rates of growth. Later studies showed that this was not necessarily so. By the 1970s, it was generally agreed that rapid growth rates had been accompanied by increased marginal or personal income inequalities and possibly increased poverty in some countries. Recognition of the failure to eliminate or substantially reduce poverty and unemployment led to consideration of the strategy of redistribution through growth, i.e., redistribution of the increments of growth to the poor. Even this gradual and incremental approach was found not only difficult to implement but slow to alleviate poverty because of leakages and other factors. This led to the basic-needs strategy of development, which implied a major redistribution of total income and the stock of productive assets, not just incremental income. Debate over this strategy is still ongoing (Morawitz 1977; Griffin and James 1979; Chenery et al. 1974; ILO 1976).

These three approaches have been tried in India at different times in the agricultural sector. The land reforms of the 1950s were designed to secure social justice within the agrarian system by eliminating exploitation and providing security to the tiller of the soil. Although intermediary tenures were abolished and millions of tenants were brought into a direct relationship with the state,[1] implementation of legislation fixing ceilings on landholdings and regulating terms of tenancy was not equally effective. In India, however, where the man/land ratio is high, radical redistribution of land, in the sense of giving each rural household some land, is neither politically feasible nor can the problems of the rural poor be resolved by this approach. The strategy adopted for agricultural development during the 1960s, which emphasized rapid growth, was similar to the first approach. Although self-sufficiency in food grains was reached, the effects on the poor were not sufficiently visible at the all-India level, perhaps because the overall rate of growth in agriculture was moderate and not rapid enough. Even in areas where agricultural growth was rapid, problems of unemployment and poverty were not appreciably resolved for various reasons.[2]

As mentioned earlier, achieving social justice has always been a policy goal under the successive five-year plans. Yet, the strategy adopted for agricultural

[1]Intermediary (zamindari) tenures were abolished over an area of 70 Mha, which covered almost the entire area held under such tenures, and proprietary rights were restored to 20 million tenants.

[2]Ahluwalia (1977) reported that in Punjab and Haryana, which experienced dramatic growth in agricultural output per person, there was no evidence of a downward trend in the incidence of poverty.

production, from time to time, reflected the most urgent needs for growth at that time. During the 1940s, when food imports from Burma were cut off, areas were diverted from nonfood (commercial) crops to food grains under the grow-more-food campaign. After Partition, when the country lost cotton- and jute-growing areas to Pakistan, this policy was reversed under the integrated production program. Similarly, at the end of the Second Plan, when a "food crisis" was threatening, the package program (IADP) was started and in the wake of the 1965/1966 drought the new strategy for agricultural production was devised, both of which aimed at a rapid increase in food grain production in areas with high growth potential. Toward the end of the 1960s, however, when the new strategy appeared to be succeeding and the "green revolution" was being ushered in, the attention of the government was drawn to the widening interpersonal and interregional disparities resulting from the adoption of the new technology. The government became aware of the newer concept of equity and social justice, which led to the formulation of special equity programs. In the beginning of the 1980s, India has the potential for a rate of growth of 3.5%/year in food grain production, through the acceleration of irrigation and fertilizer programs. The country is in a position to adapt its agricultural strategy to meet the needs of equity, in the sense of enabling the weaker sections of the population to have at least the employment and income needed to raise them above the poverty line and assure them a reasonable standard of living.

Because the new technology is neutral to scale, it is possible to raise the incomes from crop production of small and marginal farmers by providing them with preferred access to credit, inputs, marketing, and extension and by removing the operational constraints[3] facing them. For marginal farmers, landless labourers, and nonfarm rural labour, alternative occupations could be developed in the rural areas. Thus, a composite strategy can be drawn up based on the development experience of the past, which if properly implemented could lead to the achievement of the twin objectives of growth and equity.

Proposed Strategy

The seed–fertilizer technology is, by and large, applicable to irrigated and assured-rainfall areas.[4] Because productivity per hectare, income, and employment are different for irrigated and nonirrigated areas, from the point of view of growth, the strategy for agricultural production has to be considered separately for each of the two types of areas. Furthermore, the rural society may be divided into five classes: large and medium farmers, small farmers, marginal farmers,[5] landless labourers, and rural artisans and other nonfarm workers. For the most part, the rural poor belong to the last four categories. The overall agricultural strategy for attaining growth with equity has to be a composite of appropriate strategies for each of these classes.

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[3]For a full account of the operational constraints facing the small farmer adopting new technology, see Sivaraman (1972).

[4]In the case of *Kharif* rice, grown during the monsoon season, adequate drainage is also an important prerequisite. Also, some hybrids of *bajra* do well under rain-fed conditions.

[5]"The lower limit of farm size of a given productivity which divides 'small farmers' from 'marginal farmers' is a holding size sufficient to provide at least subsistence for the farm household" (Bell and Duloy 1974). The limits will have to be different for irrigated and nonirrigated holdings, the latter being roughly 1.5 times the former.

The highest priority in the proposed strategy should be accorded to the development of irrigation in areas where irrigation development is low but potential is high and to backward areas. Furthermore, schemes that benefit small farmers, e.g., community tubewells or wells, should also be given high priority. In surface-irrigation schemes, steps should be taken to safeguard the interests of small farmers in the water distribution systems. Drainage schemes are also important in high-rainfall areas, particularly in eastern India. This requires action by both the state and central governments to determine the priorities for various schemes and at the block and field levels to ensure that the benefits go to the weaker sections of the population. Irrigation programs should not suffer for want of financial resources; budgetary sources should be supplemented by institutional finances from within the country and abroad, if necessary.

Also, in irrigated areas, small and marginal farmers should be given the opportunity to adopt the new technology by providing them with preferred access to inputs, credit, and extension as a package.

Another obstacle to the small farmers' successful adoption of new technology is an inherent aversion to risk. Risks[6] may arise due to adverse weather, attacks of pests and diseases, and uncertain prices. The weather risk can be *partly* reduced through irrigation and by planting drought-resistant seeds. The effect of adverse weather may partly be mitigated through crop-insurance schemes and arrangements for rephasing of credit repayments. Risk arising from uncertain prices can be avoided by establishing purchase centres in rural areas that will enable small farmers to receive support prices.

The effectiveness and adequacy of the strategy for achieving growth with equity depends, in part, upon the ability to deal with several questions. How are growth and increases in incomes and employment to be achieved in areas with neither irrigation nor assured water supplies, i.e., dry areas? Will marginal farmers who have less than 1 ha of land under crop production have enough employment to earn an income that will maintain their families at least above the poverty level? How will the needs of annual additions to the labour force be accommodated and backlogs of underemployment and unemployment be cleared? Will the strategy work within the framework of the current agrarian structure and existing institutions?

Dry Areas

In rain-fed areas, which make up three-quarters of the total cropped area, crop yields are, by and large, low and the incidence of poverty is high. Even after full development of potentially irrigable areas, the percentage of irrigated area to cropped area is expected to increase from its present value of 25% to 42% in the year 2000 and 50% in the year 2025. Therefore, adequate attention must be paid to increasing productivity in rain-fed areas from both growth and equity points of view.

Rain-fed agriculture can be divided into four broad groups of areas depending upon rainfall: heavy, high medium, low medium, and low. Low-rainfall or dry areas can be subdivided further into arid and semi-arid regions. The farming

[6] "When risk and uncertainty are high a small farmer may prefer a technology and crop pattern which combine a low mean yield with low variance to alternative technologies and crops which although characterized by higher mean yields are also associated with greater variance" (Lipton 1968). Opinion is, however, divided on this issue.

system to be adopted in each of the areas, problems, and solutions have been extensively discussed by the National Commission on Agriculture (1976, Part VI). It is significant to note that some of the low-rainfall areas are more suitable for livestock production. The adoption in each of the areas of an appropriate strategy to promote growth helps equity in the sense that attempts to improve productivity of the low-rainfall areas will result in improving the standard of living of the people inhabiting these areas through creation of more income and employment opportunities.[7]

Low-rainfall areas have long suffered neglect, and further neglect will only serve to widen disparities between regions; equity considerations thus require that high priority be given to the development of these areas. Necessary steps should include: priority for centrally coordinated research on dryland agriculture, propagation of known technology through extension, undertaking programs for soil and moisture conservation and land development, and measures for covering risk of crop failure. It has to be realized, however, that unless appropriate technology is evolved, prospects for rapid growth in these areas are limited. Emphasis, therefore, should be on ameliorating the conditions through the optimum use of available resources. The task is large both in terms of the cultivated area to be covered and the number of families involved. Therefore, a 10-year program has to be drawn up and implemented.

Development of Subsidiary Activities

Even after adopting high-yielding varieties and the associated inputs, marginal farmers (cultivating less than 1 ha of irrigated land and 1.5 ha of nonirrigated land), as well as some small farmers, will not be able to earn sufficient net income to maintain a family of five above the poverty level from crop production alone, unless the areas are devoted to high-value crops, such as vegetables, or horticultural crops with intensive irrigation and access to markets. The agricultural sector, however, is not based solely on crop production. In fact, the role of horticulture; animal husbandry; raising of poultry, pigs, and sheep; fishing; and even farm forestry should not be ignored. Taking a more integrated view of agricultural development will help to solve the problems associated with marginal farms to a large extent. Whereas crop and horticultural production are tied to land as the main resource, other subsectors of agriculture are less dependent on land, with fisheries depending only on water resources.

There is no scope for enlarging the production base of small and marginal farmers by giving them more land. This would be possible if adequate employment opportunities existed in manufacturing and other sectors, but this is not likely to be the case in the near future. In fact, the present trend is toward a more than proportionate increase in the number of small and marginal farmers as a result of the implementation of land reform legislation, particularly the allotment of surplus land to the landless. This being the case, one method of giving small and marginal farmers supplementary employment is to provide them with facilities for engaging in subsidiary activities. A land base, even though it may be small, helps in the implementation of such programs.

Fortunately, about the same time that the new technology was extended to food grain crops, technologies involving crossbreeding and upgrading of farm

[7]Two of the significant steps taken toward the development of dry areas were the initiation of the drought-prone area program and the desert-development program.

animals for milk production were also introduced in the country. It was demonstrated that milk yields could be substantially improved through scientific breeding, better feeding and management practices, and good veterinary care. Similar improvements were demonstrated with respect to poultry, pig, and sheep production. Moreover, these subsidiary occupations could be organized on a small scale, and would be labour intensive. The bulk of the rural peasantry is familiar with these enterprises. The success of these programs, however, depends upon provision by the government of an adequate infrastructure for supplying improved animals and cattle feed, for marketing produce, and for making veterinary and health care available through cooperatives and other special institutions (National Commission on Agriculture 1971a, 1973b).

These subsidiary occupation programs should include the following features: (1) arrangements for supplying improved livestock, poultry, or fish seed should be made by the government and facilities for artificial insemination should be provided at convenient locations; (2) small and marginal farmers and the landless should be organized into functional cooperatives; (3) marketing of inputs and of outputs should be organized through these cooperative societies; (4) cooperatives should be linked to a processing plant or consumer market at the district or other appropriate level; and (5) the government should provide immunization and health care facilities.

Most of the activities connected with the production of milk, poultry, and pork products can be performed by small and marginal farmers, landless labourers, and their families. Although most of the increased production is marketed, some will be consumed by the farmers and their families, thereby contributing to their improved nutritional status and increasing their income. Thus, the development of milk production and other subsidiary activities will have three benefits: increased employment, higher income, and improved nutrition. Such programs are particularly suitable for rural households with surplus family labour.

Special livestock production programs for the benefit of small/marginal farmers and agricultural labourers were instituted during 1975/1976 following recommendations of the National Commission on Agriculture. Schemes under the SFDA supplemented the efforts of these programs. The major defect of these programs is that, at the farm level, crop production and animal husbandry programs are not properly integrated; hence, even in areas where the programs have been successful, they have not made their maximum impact on the economic conditions of the farmers.

Where the programs were organized as a package of activities, they were largely successful. The income elasticity of demand for livestock, poultry products, and fish is larger than unity and there is scope for rapid increases in production. Growth rates as high as 10%/year are feasible and have been obtained in some areas, particularly in the case of poultry products. On the other hand, there is some doubt[8] whether landless people can rear an improved cow or buffalo without a land base. The major proportion of milk presently produced in the country comes from small producers having one or two milch animals (National Commission on Agriculture 1971a, p. 4). It is now being proposed that the local breed of low milk yielding cows be replaced by high-yielding, crossbred, improved animals. It is true that feed costs are higher for improved

[8]Shah (1978) feels that "For small farmers to run a dairy enterprise as complementary to farming is unsustainable. For marginal farmers, especially, emphasis is placed on creating additional employment and income, through a supplementary occupation like animal husbandry. It can be assumed that additional supply of cattle to marginal farmers, on a large scale, will do more harm than good."

animals but yields are also higher, and with an assured market there are adequate returns to small and marginal farmers. Under village conditions, the landless milk producer receives straw, as a prerequisite, from the landlord and grazes his cattle on the village commons. If, in any particular area, these two conditions do not apply, dairying cannot be the subsidiary activity for the landless, who might then resort to raising pigs or poultry, where suitable. In irrigated areas, small and marginal farmers can introduce fodder in the crop rotation to enhance total income through mixed farming. It is important, however, that all aspects of the animal husbandry development program be implemented as a package; failures frequently cited usually are a result of measures not being implemented as a package. Furthermore, these programs have to be integrated with crop production activities at the field level. When assistance is provided to small or marginal farmers under these programs, crop production activities should be noted and adequate resources should be provided for increasing total output from the limited land resources.

Rural Industry

Even with the promotion of subsidiary activities allied to crop production, the National Commission on Agriculture has shown that it would not be possible to provide full employment to all of the unemployed and underemployed persons in rural areas unless rural industry was promoted consciously.[9] Agricultural processing, marketing, and storage facilities, which are presently located in towns and cities, operate to the detriment of the rural sector. It is necessary to ensure that these operations take place in rural or semiurban areas to alleviate the unemployment problem. With the extension of rural electrification to more and more areas, this should be possible.

Even after taking into account the linkage effects of agricultural growth on rural employment in areas of intensive agriculture, there will be large areas outside these intensive areas where rural industries need to be developed. The nature of the industry and its location would have to be carefully selected. Orienting small industries to rural areas would, in the long run, prevent migration of rural labour to urban areas in search of employment opportunities that do not exist.

Moreover, with the modernization of agriculture in rural areas, one finds some rural industries developing faster, whereas other traditional industries are decaying, e.g., a number of agricultural machinery repair and maintenance workshops have been opened in Punjab, Haryana, and Western Uttar Pradesh. Rural engineering industries have also been stimulated, particularly in Punjab. For detailed planning of their development, the dynamics of rural industries must be carefully considered. Small-scale industries are more labour intensive and employ more direct labour per unit of capital. Hence, their role is of great importance in the equity-oriented growth strategy. The thrust of the new industrial policy announced by the government was on promotion of small and cottage industries and dispersal of industries away from large metropolitan areas. The phased establishment of district industries centres to promote widely dispersed development of cottage and small-scale industries in rural areas and small towns was also envisaged. Other steps to promote rural industries include simplifying

[9]The National Commission on Agriculture (1976, Part XIII, p. 30) estimated an increase of 111.3 million persons in the rural labour force between 1971 and 2001. Proposed expansion in the various agricultural programs was likely to generate employment opportunities for about 52 million. The rest would have to be provided with employment in the nonagricultural rural sector.

licencing policies and procedures; removing critical bottlenecks of capacity and shortages; liberalizing imports; and arranging for supplies of raw material and capital for small industry. Some of the programs are not new but have suffered in the past from ineffective implementation (Ministry of Finance 1978, p. 19). By establishing district industries centres with built-in monitoring arrangements, improved policy implementation is expected.

Rural Works Programs

Rural public works programs, food-for-work programs, or guaranteed employment schemes are often suggested as immediate solutions to the problem of rural unemployment. Experience with the implementation of such programs in India has been mixed. Although the potential benefits of well planned and properly implemented public works programs cannot be questioned, cases exist where they have failed to realize their objectives because of faulty formulation and implementation. To be effective, these programs have to be organized on a massive scale and on a decentralized basis.[10] Such programs have a special role to play in drought-prone areas and during years of adverse weather. It is in these years that many of the marginal farmers and landless labourers have no employment, and even if food is available they have no purchasing power. Mere scarcity-relief works, which do not result in the creation of productive assets in rural areas, serve a very limited purpose of staving off famine during these times. On the other hand, well formulated food-for-work programs and employment schemes dealing with minor irrigation, soil conservation, land development, and rural roads help increase employment opportunities on a continuing basis and contribute to equity.

Overall Strategy

The strategy proposed includes six main elements:

(1) In areas where the potential for irrigation exists, its development should receive the highest priority. Ensuring that small and marginal farmers and backward areas receive the benefits is another priority.

(2) Small and marginal farmers with irrigation facilities should be given the opportunity to adopt the new technology "package" through the provision of inputs, credit, extension, and other facilities.

(3) A 10-year program for improving crop yields in dry areas should be drawn up and, simultaneously, research in dryland agriculture should be intensified to evolve appropriate technology.

(4) Marginal farmers with irrigation facilities, small and marginal farmers in dry areas, and landless workers should be provided with subsidiary occupations to supplement their incomes from crop production and wages. These programs should be integrated with crop production activities.

(5) Most of the activities involved in agricultural processing, marketing, and storage should be consciously promoted in the rural sector. Small-scale and cottage industries should also be developed in rural and semiurban areas as a matter of policy.

(6) Rural works programs, including food-for-work and guaranteed employment schemes should be decentralized and organized on a massive scale, particularly during drought years and in chronically drought-affected areas.

[10]Lewis (1977) made a careful analysis of the problems encountered in designing public works programs and proposed some guidelines for their organization.

7. Institutional Reform – Agrarian Structure and Institutional Development

The success of the agricultural strategy outlined in the previous chapter depends, to a large extent, upon the agrarian structure and institutional development in the country.

Agrarian Structure

Because the skewed nature of ownership and operational holdings is one of the major factors responsible for inequity and social injustice in rural areas, the question arises as to whether or not a drastic redistribution of land ownership is a prerequisite to the achievement of distributive justice. Opinion on this issue is sharply divided.[1]

The agrarian structure inherited by the colonial government prior to Independence was characterized by feudal landlord–tenant relationships and exploitation of tenants by landlords through inequitable rents. Immediately after Independence, the Government of India succeeded in abolishing feudal rights of landlords and intermediaries and attempted, although not equally successfully, to protect the rights of tenants through legislation. During the 1970s, legislation prescribing ceiling limits on lands that could be held by individual families was enacted, and landholdings above the ceilings were declared surplus and were to be taken over by the government for redistribution to the landless and marginal farmers. The implementation of this legislation has been half-hearted and tardy. By the end of 1978, only 1.6 Mha of land were declared surplus; of this 0.93 Mha was taken over by the government and only 0.65 Mha redistributed (Ministry of Agriculture 1979a). It is thought that the actual amount of surplus land would be much higher if the ceilings were strictly enforced.

Redistribution of land can be viewed from two angles even in the context of equity. The first is that millions of persons are landless in rural areas and there is a tremendous amount of land hunger. Redistribution can help either by giving a piece of land to each of the landless or enabling uneconomic holdings to become viable. The second point of view is to prevent the concentration of economic power from falling into the hands of a few rich farmers who would hinder equitable allocation of resources in rural areas.

According to Dantwala (1972), "While land reform can help to eliminate some of the worst forms of exploitation, by itself it cannot solve the problem of

[1]The respective roles of technology and institutional change in achieving growth and social justice have been the subject of continuing controversy. One side maintains that, without institutional change, distributive justice cannot be attained; the other stresses the importance of technological factors in equity-oriented growth. Dantwala (1978) pleads for a judicious blend of technology, institutional reform, and public investment in infrastructure depending upon the specificity of the temporal and spatial situation.

poverty. . . . Application of the ceiling is a necessary and desirable reform, but a *drastic* lowering of the ceiling is not likely to be rewarding either for agricultural development or significantly better agrarian relationships. High priority in land reform in the present context should be given to 'protective' legislation, prevention of land acquisition by persons with big money, influence, or political power, and protection of tenants and sharecroppers against evictions. Land reforms per se can do little for the small farmers."

Dandekar and Rath (1971) have also categorically expressed the view that "it is futile to try and resolve the problems of the rural poor in an overpopulated land through redistribution of land which is in short supply." They have shown through simple calculations that once it is agreed that landless households should receive priority in any redistribution of land, and on that basis that some land should be given to every rural household, even with very low ceilings, no more than 0.2 ha can be given to any one rural household in many states. An analysis by Minhas (1974) arrived at similar conclusions. Thus, under Indian conditions, *drastic* redistribution of land ownership cannot be a precondition for implementing programs of growth with distributive justice. It is, however, necessary to ensure that there is no undue concentration of land in a few hands and that the tiller of the soil is given the opportunity to reap the benefits of his efforts. These objectives should be achieved through strict enforcement of the ceilings and tenancy legislation upon which there is general consensus within the country.

The National Commission on Agriculture also recommended a peasant proprietorship oriented agrarian structure. Within this structure, cooperative activities must be promoted by forming functional groups or societies for area-based agricultural activities, such as plant protection, and land development programs, such as soil conservation, contour bunding, and consolidation of holdings, which are most effective when organized on an area basis. Some of the minor irrigation schemes need to be organized for groups of small farmer beneficiaries. Mechanical cultivation can also be accomplished efficiently if conducted jointly. For organizing some of these activities, beneficiaries need to form groups or cooperative societies and pool the land together to carry out specified operations.

The tenancy system under which nearly 25% of the land is operated is considered to be an important reason why the new technology has not spread rapidly in some rural areas. Of this area, only 10% is under open tenancies, and small farmers account for one-third of wholly rented land and one-seventh of partly owned and partly rented land. The real problem areas involve crop-sharing tenancies and oral leases. The extent of small farmers' shares in these tenancies is not known. Under crop-sharing tenancies, neither the owner nor the tenant is interested in undertaking land improvement measures. Also, the tenants, because they have no right to the land they operate, are not eligible for medium- or long-term credit. However, it is not altogether possible to abolish the tenancy system. It has to be regulated in such a way that it is conducive to increasing production and also ensures an adequate share of the benefits to the tiller of the soil.[2] Questions arise, therefore, regarding the type of tenancy to be permitted, i.e., fixed cash rent or rent as a proportion of gross output, and whether or not large farmers should be allowed to take land on lease from small farmers and

[2]For a review of theoretical literature on share tenancy in relation to efficiency and the conditions under which share tenancy would not be inefficient, see Sen (1975).

vice versa. The National Commission on Agriculture recommended that ultimately there should be no leasing of land under the land-to-the-tiller concept; but, until socioeconomic development in the country effects a radical change in the man/land ratio, tenancy would have to be permitted in a restricted form, i.e., leasing in should be permitted only in the case of marginal farmers and leasing in land by large owners from small owners should be discouraged. All tenants of landowners possessing land above marginal holdings should be vested with proprietary rights and declared owners, with suitable concessions being given to disabled persons, minors, widows, and army personnel. These recommendations sound prima facie quite reasonable and not very radical. As long as the existing rural power structure continues to be reflected in the state and central legislatures, however, it will be difficult to get suitable legislation enacted, and even if enacted implementation is still a long way off. The result will be that land records will be tampered with and there will be no open tenancies except those in the permitted categories. Concealed tenancies, which are difficult to regulate, will increase. Open tenancies, which can be regulated on terms fair and reasonable to the tenant, should be preferred and may be in the interests of increased production and equitable distribution. There is a view that crop-sharing tenancies, under which both expenses and profits are shared equally, should be permitted. Vyas (1979a) is also in favour of "open and regulated tenancies which can be made to serve the interests of the small farmer in a more effective way than ineffective abolition of tenancy." V. Rao (1974) also supports this view. He has suggested that all rents (cash) should be paid to a government bank or designated and approved private bank and disbursed to the landlord.

The National Commission on Agriculture recommended that agriculture be treated as a family occupation of the peasant cultivator and not as a source of subsidiary unearned income, and that in a normal peasant proprietor economy absentee landlordism should not exist. Although some concessions have been allowed with regard to leasing land, there are some categories of persons who have other occupations and also own or have a right to land. This is true with respect to most of the recent migrants to urban areas. Hindu laws of inheritance and succession provide for equal shares for all the sons, daughters, and the wife. Consequently, lands owned by such people are being cultivated by some of their near relations in rural areas (perhaps on behalf of the real owner), and in a strict sense all of these are absentee landlords. After the amendment of the Hindu law under which daughters receive an equal share in the father's property, absentee landlordism has been on the increase because the wife goes to her husband's residence, which may not be within the operational distance of the inherited plots of land. Because of increasing pressure on land, even sons are leaving rural areas for jobs outside, but still retain their title of ownership to their share of their father's property (in actual practice, one of the brothers, often the least educated, manages the farm as one technical unit).

It is indeed naive to describe all of these owners of small pieces of land as rentiers; nor are they marginal farmers, however, in the strict sense of the term. They are urban absentee landlords holding onto their small piece of inherited land in rural areas, which often serves as security in the event of sickness or temporary disability, retirement or failure of business, or a temporary loss of other sources of income. To deprive these persons of their small piece of land in the absence of state-assured social security measures or pensionable jobs may be questionable from the viewpoint of equity. Changing the laws of inheritance to the law of primogeniture may be a solution but cannot be offered as a serious

alternative in the absence of nonfarm employment opportunities. Here then is a dilemma: in the interest of production, absentee landlordism should be abolished, but the case for not dispossessing the small landholder with other main occupations seems to be strong.

A clear distinction between rich landowning rentiers and small holders having other professions is required. The bulk of the former category has been abolished and the remaining cases also should be phased out by refusing permission to lease out their lands. The lands held by the latter group are presently operated through relatives on an informal basis and no formal agreements are made for fear of being affected by adverse tenancy laws.[3] This situation should be recognized and allowed to continue, with the landowners registering such tenancies openly and regulating the terms and conditions of rents. Many small owners would prefer to accept reasonable rents under a regulated tenancy system than to dispose of the land at nominal prices.

Another suggestion that has been made is to organize the lands of absentee landowners into viable farms and have a corporate or cooperative system of management for them. It is possible to bring together, on a voluntary basis (not in the geographical sense), all such farms situated in adjoining villages and operate them through a paid manager and hired labour. The corporation/cooperative would lease the land from the absentee owners on suitable terms that would be attractive for the absentee landlords yet discourage local landowners from abandoning cultivation and migrating to urban areas. Financial institutions could provide the working capital on commercial terms. Reasonable precautions should be taken to limit their size and restrict membership to genuine absentee landowners. If small holdings are pooled together without transferring ownership, it should be possible to adopt land improvement measures and scientific methods of crop production for increasing overall productivity.

Another essential institutional reform meriting speedy implementation as a measure of distributive justice is consolidation of landholdings. For example, in the absence of irrigation, large areas in northern and northeastern India grow poor or no crops during the *rabi* (winter) season. In many of these areas, there is plenty of groundwater that could be utilized by installing mobile pumpsets on wells if the small holdings, which are presently scattered over six or seven fragments, were consolidated into two or three parcels.[4] If this was done, high-yielding and assured technology could be adopted by these farmers.

Institutional Development

The most essential prerequisite for the success of small farmer oriented strategy is equipping existing institutional agencies or setting up new institutions to supply inputs and credit and provide marketing facilities to small and marginal farmers in an integrated manner. The usual agencies for supplying inputs are the general traders, manufacturers' shops, departmental depots, and cooperatives; but most of these are not accessible to small farmers when inputs are in short supply. Traders will not go into difficult or remote areas. Manufacturers and

[3]This is the reason that the 1971 agricultural census could not reveal these absentee landowners nor would any national sample survey bring them out into the open because the investigators have to depend upon information furnished by the respondent.

[4]In areas where waterlogging or a lack of drainage is a major problem, farmers will be interested in having their lands in two or three different parcels as a measure of insurance.

traders are interested in sales promotion and quick profits. The cost of operation is less and profits are greater if a smaller number of farmers purchase large quantities. Government agencies supplying inputs are often limited by availability of finance. Cooperative agencies are, in several cases, dominated by vested interests. Thus, it has been suggested that there should be separate institutions for catering exclusively to the input and other needs of small and marginal farmers. This suggestion, however, is not desirable because, although the number of small and marginal farmers is large, the area they cover is small, their input and credit requirements are proportionately small,[5] and so is their marketable surplus. To organize a separate viable supply or marketing unit, the jurisdiction of the unit has to be large. This increases the cost of servicing and there would be no personal interaction between agency and client. As a national policy, it would be advantageous to have a multiagency approach to input supplies because this would lead to healthy competition between different agencies. The agencies catering to the needs of small and marginal farmers would have to provide inputs, credit, and marketing facilities in an integrated manner, as a package, to facilitate adoption of the new technology.[6] It is in recognition of this fact that the National Commission on Agriculture recommended setting up farmers' service societies (FSS) and suggested that these societies should also provide extension services at a later stage (National Commission on Agriculture 1971b). Furthermore, the small and marginal farmers' access to inputs is severely restricted when supplies are scarce. This constraint can be overcome by making ample supplies available at convenient locations within their reach. Thus, to encourage a viable small farm sector, a major restructuring of input supply, marketing, and credit institutions is urgently needed.

It is true that cooperatives were expected to cater to the needs of small and marginal farmers; but in most areas the cooperative societies are dominated by the rich farmers. Separate quotas for small farmers' credit can and have been prescribed but these are difficult to enforce and are liable to be misused. The National Commission on Agriculture sought to overcome this difficulty by recommending a majority representation of small and marginal farmers on the executive committee and having a trained, full-time manager to look after day-to-day operations of the FSS. The experience of the FSS has not been uniformly good, but in some areas, notably Karnataka, they are reported to have done extremely well.

Even though remunerative prices are assured to producers, small farmers do not get the benefit of these prices because their surpluses are too small to be transported economically to the purchase centres. Therefore, they sell their produce to middlemen, who are often the larger farmers cum traders in the village, at considerably lower prices. Arrangements, therefore, have to be made to open more purchase centres in rural areas within the reach of small farmers or to enable them to pool their surpluses and transport them to the purchase centres. Similar pooling will also be necessary for processing the produce and marketing it after grading. In some cases, functional cooperatives linked to farmers' service societies or cooperative credit societies at the appropriate level may have to be organized, particularly to handle processing and marketing of perishable products such as milk, poultry, meat, fruits, and vegetables.

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[5]Whereas large and medium farmers can meet part of their needs through their own financial resources, small farmers have to rely on borrowed funds to a greater extent.

[6]When larger farmers are convinced of the profitability of the new technology, they will use their influence to obtain input supplies and credit.

Development of rural roads is essential to facilitate marketing of inputs and outputs and particularly for transporting perishable products. Extension of rural electrification would help processing and storage of these products. Although adequate financial provisions have been made for these schemes under the minimum-needs program in the draft of the Sixth Five-Year Plan, it is important to ensure that these facilities are created as a priority in areas where subsidiary activities programs are taken up.

For small farmers to have the benefit of medium-term credit from institutional agencies, they must have title to the land they operate. This requires a good land records system; land development banks set up in the command areas of irrigation projects under the command-area development program could not advance loans for land leveling and development in some areas because of the absence of a land title. A similar experience was faced by the Rural Electrification Corporation. In some land records, the tenants' rights were not recorded. In some cases, where tenants insisted that their rights be recorded, they risked losing the tenancy itself. Particular attention should be given to this matter. Existing land records must be brought up to date, specifying the names of tenants and nature of tenancy.

Although it is not necessary that the institutional setup be the same throughout the country, it is important that the setup respond to the needs of the area. Moreover, it is the function of the block level agricultural development organization to ensure that each area has an agency to cater to the needs of small and marginal farmers.

Agricultural Extension

The Indian farmer is perfectly capable and willing to adopt improved techniques given sufficient motivation, the necessary resources, and introductory demonstrations of the new techniques. Types and modes of extension differ between small and large farmers, just as there are differences in the extension techniques adopted in developed and developing countries.

The agricultural extension agency set up in 1952 under the community development program has come a long way. However, there is still considerable debate over the functions and departmental location of the village-level workers: (1) Should they have agricultural functions only or should they be multipurpose workers at the village level? (2) Should they be located in the Community Development Department or in the Agriculture Department?[7] (3) Should they have supply functions or not? Their jurisdiction has also been under review. In the general community-development blocks, the village-level worker had a jurisdiction of 10 villages; this was reduced to half under the intensive agricultural district program, and under the intensive agricultural area program was limited to seven or eight villages. Although village-level workers are multipurpose workers, it was expected that 80% of their time would be devoted to agriculture.

The deficiencies in this system are well known and adequately documented: village-level workers devoted more time to amenities and ostentatious programs that were more rewarding; they did not have a real feeling for technical agriculture; in a village, they contacted only, if at all, the well-to-do and more pro-

[7]The National Commission on Agriculture recommended a single line of control from the village to the union level but, because the approach of integrated rural development involves multifaceted development of rural areas to provide basic minimum needs, this question is still being debated.

gressive cultivators; some of the cultivators knew more about the technical aspects of agriculture than the village-level worker; and it would be impossible to cover all of the cultivating families under the jurisdiction of the village-level worker. The result was that the extension agency could not perform the functions expected of it effectively, particularly under the new technology, and small and marginal farmers did not receive any attention from the village-level worker.

To resolve most of these criticisms, a new "training and visits" system of extension is being tested in eight states in India.[8] Under this method, a systematic program is arranged for training village-level workers, followed by frequent visits to farms. The village-level worker first receives intensive training in specific agricultural practices and recommendations directly related to farm operations for the coming fortnight. Thereafter they visit, on a prearranged basis, each of the relatively small groups of farmers of the locality every fortnight to train them in new techniques. The system also provides for close supervision and monitoring of the extension work.

The training and visit system essentially encourages farmers to adopt improved management practices[9] involved in crop production, which are generally labour intensive. The system, therefore, is best suited to small farmers who cultivate their own land and have surplus family labour that can be put to more productive use. Although the improved practices lead to higher yields (particularly under irrigation with high-yielding seeds and fertilizer), in dry areas the increase in yields may not be as spectacular, particularly where adequate dry farming technology is not available. The extent to which large farms using hired labour, crop-sharing tenants, and marginal farmers who seek employment outside the farm can adopt labour-intensive methods remains to be seen, unless the gains in income far exceed the additional wages to be paid to hired labour or the nonfarm wages forgone.

Two issues arise for consideration in this context: (1) Is there a difference between the technologies adopted by large and small farmers? (2) Should the delivery systems adopted for dissemination of the technology be different? To be most effective, the farming techniques adopted by small farmers should be less capital intensive, at least during the initial stages. Dissemination of the techniques has to be carried out on a "group" basis, keeping in mind the large number of farmers involved. Thus, a definite small and marginal farmer orientation needs to be given to the training and visit system of extension.

Agricultural Research

The Indian agricultural research system is made up of the Indian Council of Agricultural Research at the centre, in a coordinating and directing role; central research institutes and all-India coordinated research schemes (fully financed and staffed by the Indian Council of Agricultural Research); state agricultural universities; and research farms and stations of the state departments of agriculture. Although this system is organizationally sound, most of the research

[8]This system has been proposed by Daniel Benor, an Israeli expert, and is sponsored by the World Bank (Benor and Harrison 1977).

[9]These practices include better land preparation, improved seedbed and nursery maintenance, increased plant populations, use of good seed, seed treatment, tilling operations, weeding, proper spacing of plants, etc. They involve little or no cash outlay, very little risk, and are said to produce sure results (Singh 1979).

Table 7.1. Financial outlays for coordinated research projects (Rs × 10^5), agriculture Fifth Plan and draft Sixth Plan.

	Fifth Plan (1974–1979)	Draft Sixth Plan (1978–1983)
Project directorates		
Rice	145	210
Wheat	96	190
Pulses	200	280
Oilseeds	263	470
Dryland agriculture	325	238
		+239[a]
All-India coordinated research projects (agriculture)		
Food crops		
Barley	20	30
Maize	82	150
Sorghum	85	104
Millet	50	120
Forage crops	32	85
Commercial crops		
Sugarcane	60	71
Sugar beet	25	40
Cotton	135	200
Jute	34	49
Soybean	28	60
Tobacco	47	64
Horticultural crops	284	549
Plant protection	—	322
Soil science and water management		
Water management	202	245
Soil science	200	364
Agronomic research	340	502
Agricultural engineering	145	337
Operational research and national demonstrations	502	475
Total	3300	5155

Source: Ministry of Agriculture and Irrigation (personal communication).
[a]To be found from savings within the plan.

efforts are rapid-growth oriented, as indicated by the financial allocations for coordinated research schemes (Table 7.1). In order to give research programs an equity orientation, changes in priorities are urgently needed. There should be more emphasis, higher priority, and larger financial allocation to research on improvement of crop yields in dry areas, poor soils, and crops grown and consumed by the poor. New varieties and associated cultivation practices should be tried over large compact areas covering small farms to determine what difficulties will be encountered by farmers adopting the changes and the adaptations needed to suit them. More emphasis should be given to research oriented toward stabilizing or reducing variation in yields; varieties with built-in resistance to drought, pests, and diseases; and shorter duration varieties that, under irrigated conditions, enable small farmers to enlarge their land base through multiple cropping and increased cropping intensity. Labour-intensive, low cash input technologies should have precedence over labour-saving, high input cost technologies. Research on small tools and equipment for precision farming should be intensified.

Because emphasis in the proposed strategy is on the combination of crop production and subsidiary activities for ensuring a reasonable income to small

and marginal farmers, more research on mixed farming under these conditions needs to be conducted in different areas. Agricultural strategy oriented toward growth with equity calls for greater efforts in both micro- and macrolevel research on the socioeconomic aspects of agriculture to diagnose and find solutions to problems. Interdisciplinary research involving both physical and social sciences is, therefore, imperative.

8. Reorganization of Agricultural Planning and Implementation Procedures

The six elements of the overall strategy proposed in Chapter 6 are not materially different from the policies and programs outlined in the draft of the Sixth-Five-Year Plan. In fact, some of these programs have been in operation for several years. For various reasons, however, they did not visibly reduce income disparities nor ameliorate conditions of the weaker sections. With the present method of formulating schemes and fixing physical program and production targets at national and state levels, there is no built-in procedure for building them up from lower levels nor are the operational details of the overall policies and programs fully worked out at the local level in many cases. Even when these details are worked out, they do not reflect growth and equity objectives. For example, in irrigation and fertilizer distribution programs, small and marginal farmers do not receive priority attention and so are not able to receive full benefits. In the absence of attention to operational details, institutional agencies are not fully geared to make productive assets available to these farmers over large areas. Another problem is that the programs are based on an individual crop, type of livestock, or sector, and until recently there was no attempt to integrate them at the farm level. Even facilities provided under subsidiary activities programs are often not available as a package. Only recently have some area programs been drawn up, but their aggregate coverage is still small. A final problem relates to the fact that field implementation of several programs is poor. Most of the deficiencies are the result of inadequate planning and implementation procedures.

Decentralized Planning

In India, plan formulation begins at the national level, with a view toward balancing overall and sectoral investments within the available resources. The top-to-bottom approach is then used to extend the plan to lower levels.[1] In the agricultural sector, this exercise is carried out at two levels, national and state. The physical program and production targets are not built up from below but are broken down from the national/state level to district and lower levels. Although during the initial exercise the targets at the national and state levels are based on the performance in the previous year or plan, the scope for acceleration, and the expected potential, these targets are not worked out from the village upward. Failure to achieve the targets of some programs is attributable partly to the fact that the targets were unrealistic to begin with. The method adopted may also

[1]The term "planning" has acquired a special meaning in India. It "attempts a middle way between a comprehensive national plan and indicative planning (in sectors where it has no effective authority)" (Hicks 1979).

result in misallocation of resources to different districts and unnecessary and avoidable transfer or physical movement of these resources between districts during the course of implementing the programs.

The case for decentralized planning, particularly in the agricultural sector, is obvious. It would facilitate optimum use of locally available resources and make the programs more realistic and feasible. Decentralized planning enables various activities to be organized in a mutually supportive manner (Vyas and Mathai 1978). It also helps to ensure that economic opportunities are created for those groups that are bypassed in the top-to-bottom approach. Planning from below does not mean that someone should go to each and every household and tell them what to do (Vyas 1978, pp. 1–2). What is suggested is that agricultural schemes/programs should be formulated at lower levels and then aggregated at district and state levels. This procedure is possible for aspects that are amenable to local-level planning, e.g., minor irrigation and input distribution. The same procedure should be adopted while working out operational details at the implementation stage, keeping the needs of social justice prominently in mind.

If such detailed schemes are formulated at the local level in areas that are likely to benefit from irrigation and fertilizer programs, which are the major programs that contribute to accelerated production under the Sixth Plan, it would be possible to ensure that irrigation, fertilizer, and high-yielding varieties are applied on the same farms, and that small and marginal farmers in the area participate in the growth process. Such local-level planning should also ensure that crop production and subsidiary activity programs are integrated at the farm level and that all elements of these programs are available as a package.

It may not be possible to prepare such detailed schemes for all local areas in a district simultaneously because this would require an extensive agricultural planning organization. Preparation of detailed schemes for the programs included in the Sixth Plan should be carried out in a phased manner.

Although the need for planning from below was recognized in the First Plan and emphasized in successive five-year plans,[2] several aspects of this concept still remain vague. The first is the unit of planning. The National Commission on Agriculture recommended that an effective unit for drawing up an integrated plan and budget for agricultural development is the district (National Commission on Agriculture 1976, Part XIV, p. 8). It recognized the need, however, for building up agricultural schemes and programs from lower than the district level wherever necessary and feasible. In its view, the district is the level at which not only different programs within agriculture (i.e., land development, irrigation, input supplies, crop production, and animal husbandry) could be brought together, but also intersectoral coordination could be accomplished. The committee on panchayati raj institutions (Ministry of Agriculture and Irrigation 1978b, p. 72) also favoured the district as the strategic level of economic planning. The additional advantages of the district as the planning unit include: a better data base, availability of expertise from various government departments, scope for decision-making, and the possibility of rural–urban linkages at this

[2]In a letter addressed to the states as early as August 1951, the Planning Commission stressed the need to evolve, initially in the areas selected for intensive development, a system of agricultural planning in which all units, beginning with the smallest, can play an active part in formulating programs. The idea of planning at village, block, and district levels emerged in the Second Plan but specific guidelines for the preparation of district plans were issued by the Planning Commission only in 1969. For a comprehensive review of the efforts toward "planning from below," up to the Third Five-Year Plan, see Hanson (1966, chapter on "grass roots"). For additional information, see Reddy (1979).

level. The working group on block-level planning (hereafter referred to as the working group), after emphasizing the place of the block as the planning unit, visualized district- and block-level planning as part of the same exercise and expressed the view that it was not an either/or type of choice. The block is generally the most convenient operational unit for formulating initial schemes or plans, whereas the district will be the administrative unit at which coordination can be carried out not only between different schemes within agriculture but also between different sectors. In some cases, the relevant planning unit may be a watershed or homogenous agroclimatic unit.

The second vague aspect is the scope of decentralized planning. Two closely related concepts of local-level planning may be distinguished. The first implies that, whenever schemes or programs are drawn up and targets fixed, these should be built up from lower levels. The second concept involves formulation of an area-based development plan for all sectors or for agriculture at the local level, e.g., a "block," and building up the entire plan for the district, state, or nation, the plan at each level being an aggregate of plans at lower geographical levels. Although the working group made detailed recommendations on block-level planning after examining at length the planning process and organizational pattern needed, and even though the government also issued detailed guidelines, many aspects of this exercise, based on the second concept, are not yet clear. In particular, the relationship between the plan for the selected block and the five-year/annual plan for the relevant district, the manner of utilization of additional allocations, the participation of local people in the planning process, and the role of voluntary organizations all need to be studied in depth. Whenever area-wide block-level plans are prepared in rural areas, because agriculture is the principal activity in these areas, the agricultural plan becomes a major component of the block-level plan and will cover all the operational programs and schemes in the agricultural sector in the block. The preparation of block plans covering the entire country, however, will take time. In the meantime, the first concept of decentralized planning should be adopted in agriculture, particularly with respect to priority programs of irrigation, fertilizers, crop production, and subsidiary activities.

The third aspect that remains vague is the organization required for decentralization planning. The National Commission on Agriculture recommended setting up an agricultural planning unit at the district level, under the chief agricultural development officer, separate from the general planning setup at that level (National Commission on Agriculture 1976, Part XIV, p. 193). The committee on panchayati raj institutions recommended that the district planning unit should be with the Zilla Parishad under direct supervision of the chief executive officer. The composition of the district-level planning team,[3] suggested by the working group and accepted by the panchayati raj institutions committee, would include only an agronomist from the agricultural discipline. In addition to the agronomist, economist, and statistician, qualified staff from other agricultural disciplines, such as soil science, farm management, and animal husbandry, will also be necessary for the agricultural planning unit at the district level. Other specialists in horticulture, fisheries, etc. will have to be added where necessary. The argument for a separate unit for agricultural planning is based on the premise that, in decentralized planning at the local level, agriculture accounts for the

[3]The members of the team included an economist/statistician, an agronomist, a cartographer/geographer, an engineer (irrigation/civil), an industries officer (small and cottage industries), and a credit planning officer.

bulk of the programs and planning for programs in other sectors (i.e., education, health, roads), being relatively easier, may claim more of the general planning unit's attention, to the detriment of agriculture.[4] Moreover, to the extent that planning and implementation go together, agricultural planning should form part of the functions of the single line of administration advocated by the National Commission on Agriculture. These reasons suffice for separating agricultural planning from general planning while still providing for suitable coordination at the district level.

Although both the working group and panchayati raj institutions committee agreed that the planning team should be located at the district level and operate as a peripatetic team and the panchayati raj institutions committee suggested that the district plan be built up from block plans, they failed to address the problem of the time involved in preparing block and district plans. A block plan, even assuming that all relevant data are available, will take at least 4 – 6 months to prepare initially. If there are 15 blocks in a district, it will take 5 – 7 years for one peripatetic team to complete the total plans for the district. By this time, the plan for the first block will be 5 – 7 years out of date.[5] On the other hand, one cannot have 15 teams in a district, or even 7 or 8, to prepare all of the block plans simultaneously, due to a lack of trained personnel and the large financial implications.

The agricultural planning unit under the chief agricultural development officer should concentrate on the preparation of detailed schemes at the local level in the priority programs. In addition, it should also be responsible for the preparation of the agricultural components in the blocks selected for block-level planning. Apart from the political will needed to implement decentralized planning, two other requisites are: additional financial resources for setting up agricultural planning units and availability of trained personnel. Once a firm decision is taken in this regard, the requisite personnel could be trained within a reasonable period of time through agricultural universities and other institutions.

Land-Use Planning

Another major improvement in agricultural planning needed to ensure rapid growth and interregional equity is land-use planning, the importance of which

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[4]The experience of community development programs indicates that the block staff pays relatively more attention to eye-catching programs related to rural amenities at the expense of more difficult programs related to increasing agricultural production. Facilities for schools, hospitals, drinking-water wells, roads, etc. are to be created at the village level or above, whereas input supplies, credit, and extension services for agricultural production are to be provided to individual farmers, particularly when they are designed to benefit small and marginal farmers.

[5]The time taken to formulate an agricultural development plan at the block level varies depending upon the size of the block, existing level and potential for development, availability of data, and nature and scope of the plan to be prepared. Although a number of attempts have been made to prepare detailed plans at village, block, and district levels by various nonofficial agencies and research institutions, no single pattern has yet crystalized. One approach envisaged preparation of detailed farm production plans for each individual cultivator. Others are satisfied with the collection of a list of the requirements of inputs from each of them. Some "plans" attempt to gather information by means of resource-inventory and current-status data covering not only the area, production, and productivity of crops, livestock, and fisheries; the use of inputs, credit, potential for irrigation, land development, and reclamation; but also the socioeconomic characteristics of the rural population, including health, education, employment, housing conditions, income, expenditures, savings, etc. as a prerequisite to the preparation of a development plan. Thus, a lot of time is spent collecting data. What is needed is not an academic exercise but an exercise for action to be initiated within a short period, which may require further modification with time.

has been underscored in the draft Sixth Five-Year Plan, 1978–1983, and by the National Commission on Agriculture. As noted in the plan, "for achieving the required production level and for improving the economy of the rural poor, the utilization of the limited land resources will need to be optimized consistent with the ecosystem. . . . It is also necessary to ensure that the production capacity of land is continuously improved and maintained and its deterioration prevented. Land use planning will need to be based on a resource survey and production potential of the land" (Planning Commission 1979a, p. 263). Cropping systems will have to take into account soil suitability, rainfall patterns, and water availability. There is also a need to bring more land under fruits and vegetables and cultivated fodders. Mixed farming is also suitable in marginal lands with low or medium rainfall. Where rainfall is scanty, a silvipastoral approach will be needed. Only through such an approach can balanced regional development be brought about, and the living conditions of the poor inhabiting these areas be improved.

When the country had a huge food deficit and was under the influence of high prices, cultivation of food grains was extended to marginal lands. Also, when there were deficits in several commodities, crop planning did not assume significance. However, as soon as significant surpluses develop in some cereals and in some regions, while deficits continue in pulses, oilseeds, and other crops, the reallocation of land and other resources to different crops is both necessary and desirable to achieve desired land-use and crop patterns.

A major difficulty in the adoption of land-use planning has been the lack of requisite information on rainfall and temperature, soil characteristics, and cropping patterns at the local level. This information has now been compiled and presented by the National Commission on Agriculture. Agricultural universities can indicate, on the basis of field trials and experiments already conducted, desirable patterns for each area that are agronomically feasible and are remunerative to the farmer. These could then be propagated through extension agencies wherever necessary. These efforts should be supplemented by supplies of inputs (seeds and fertilizers), processing and marketing facilities, and other suitable incentives. Before any cropping pattern is recommended, the expected price and anticipated net return from the crops should be examined. The aggregate supply should be checked with the aggregate demand and any adjustments needed between them should be made through trade and price policies. These should be continuously reviewed. Land-use planning in this sense is feasible, particularly after decentralized planning is adopted.

The National Commission on Agriculture reported that paddy was being grown in upland areas in Uttar Pradesh, Madhya Pradesh, and Bihar, where it should not be grown at all because rainfall patterns are unfavourable and assured irrigation unavailable. It recommended that paddy be withdrawn from such areas, to be replaced by crops such as maize, soybeans, and blackgram (National Commission on Agriculture 1976, Part VI, p. 65). Agricultural scientists and economists should jointly indicate alternative crops that could grow well and command good prices, enabling cultivators to obtain better returns. Once this is done, extension workers could propagate the crop on a routine basis.

Successful but isolated cases in which new crops have been introduced include: cultivation of cotton in rice fallows and introduction of *baisakhi mung* in northern India, where summer irrigation is available; maize in Karnataka; wheat in West Bengal, and soybean and sunflower in northern India. A case in which an unsuitable crop has been discouraged involved tobacco cultivation in the heavy black soils of Andhra Pradesh.

Crop planning should become a regular component of decentralized planning. Scientific crop planning as a part of land-use planning is imperative in the long run not only to maintain and improve soil productivity but also to achieve sustained rates of growth coupled with the needs of equity so that farmers in both irrigated and rain-fed areas take up crop and livestock production suited to each area and participate in the growth process.

To direct and coordinate efforts for promoting land-use and crop planning, it is necessary to set up a land-use commission in the Ministry of Agriculture and land-use planning boards in the agricultural development departments in the states.

Implementation

Since the inception of the First Five-Year Plan, attention has been drawn to the need for proper implementation of its policies and programs. The tasks of public administration and the role of public cooperation in national development were discussed in detail in the First Five-Year Plan and were reemphasized in the Second and Third Plans. The agricultural administration committee (Ministry of Agriculture 1958), Ram Subhag Singh committee (Ministry of Agriculture 1963), and Administrative Reforms Commission (Ministry of Home Affairs 1968) also dealt with various aspects of agricultural administration and the need for effective implementation of the plan programs. More recently, the National Commission on Agriculture (1976, Part XIV, pp. 17–20) has also looked into this situation. Yet, severe shortcomings in implementation continue. The 1978–1983 plan (Planning Commission 1979a, p. 253) groups the major problems resulting in a significant gap between planning and implementation into: (1) technical, administrative, and managerial problems; (2) inadequate data base and information systems; and (3) inadequate attention to interlinkages, lack of a systems approach, and a poor monitoring and evaluation/feedback system.

Included in the first group are: inadequate investigations and data collection; inadequate detailed planning of projects in terms of time schedules, input resource requirements, and the skills needed for project implementation; lack of delegation of authority to subordinate organization levels; delays in issuing sanctions, approvals, fund authorizations, and releases; organizational weaknesses in planning and implementation at various levels; lack of specific assignment of responsibility and accountability for results; inadequate motivation of personnel and incentives and commitment to results; and inadequate representation of the weaker sections in elected bodies. Other weaknesses include: unrealistic fixation of targets and a lack of orchestration and synchronization of various components of the scheme, funds, staff, and materials.

Organizational weakness may arise from engaging untrained staff in plan formulation and implementation; indifference, lethargy, or a lack of integrity and moral standards on the part of the staff; or the heavy burden cast upon the staff. Because the implementing staff at the lower levels are generally not associated with the scheme at the formulation stage, they may not be aware of the full implications of the programs. The lack of political will and commitment to equity, particularly at the lower levels, and the conflicts of interests between the haves and the have-nots (the former having both a political and economic stronghold in the power structure) are among other causes for poor implementation.

Whatever the causes, the result is that the schemes are not completed on time. This delay results in cost escalation, leading not only to the postponement of

benefits but also to their reduction. The schemes are completed but the anticipated benefits are not realized for want of concomitant measures. The schemes are implemented and the physical targets are achieved but benefits to the target groups do not accrue due to leakages. Because of poor-quality materials and performance standards, the works break down and they do not yield benefits. Schemes are reported completed but, in fact, have not been undertaken, the funds having been misappropriated or wholly or partly misutilized.

The draft Fifth Plan attributed the gap between the target and achievement of irrigation programs during the Fourth Plan period to: (1) slippage in construction schedules leading to the creation of an additional irrigation potential of 3.3 Mha against the anticipated target of 4.8 Mha; (2) a gap in the utilization of irrigation potential and nonefficient use of land and available irrigation supplies, and (3) the execution of projects at a pace slower than the technically optimum level. Among the factors listed as being responsible for this were: inadequate investigation and preparation of project reports; proliferation of projects under construction leading to a thin spread of financial, managerial, and technical resources; absence of overall planning and determination of priorities; unavailability of construction materials such as cement and steel; unforeseen cost escalation; and nonadoption of measures for integrated area development of the irrigation commands (Planning Commission 1974, pp. 104 – 105).

The most outstanding example of tardy implementation is with respect to land reforms, where even with continued emphasis on the imposition of ceilings on landholdings, enforcement of legislation is poor. The main causes of this include the lack of political will, the influence of vested interests in rural areas, lack of commitment of executive agencies at lower levels, the corrupt practices adopted by revenue and land record agencies at different levels, and the absence of up-to-date land records. Even the judicial system was partly responsible for the delays in implementation, with the result that certain types of land reform legislation had to be excluded from its purview. It is often openly said that loopholes are deliberately kept in the legislation to facilitate evasion (National Commission on Agriculture 1976, Part XIV).

Attention has already been drawn to the leakages of benefits from SFDA and MFAL programs due to ambiguity in the definition of small and marginal farmers during the earlier years.[6] Agricultural credit drawn at concessional rates in the name of small farmers in fact finds its way to the bigger cultivators. Also, in the case of loans to farmers, land is demanded as security, although in terms of the Reserve Bank of India's instructions, crop loans do not need land to be offered as security, and for medium-term loans the assets could be pledged. Subsidies granted under various government programs do not reach the beneficiaries, a large portion being siphoned off by officials through whom the money must pass. Crossbred animals are distributed without synchronized arrangements for veterinary health and feed supply programs or without adequate arrangements for marketing of milk. Large marine fish catches are allowed to rot for want of processing, refrigerated storage, or transport facilities.

It is obvious that the most important lacuna in the present administrative system is that no one is responsible and accountable for results. During the early stages of planning, the block development staff of the Community Development Department was recognized as the development organization in the field with

[6]The administrators devised a simple, workable definition based on the area of the holding. This simplicity has been taken advantage of by implementing agencies to benefit the not-so-poor among the cultivating classes.

an extensive base going down to the village level. However, achieving the targets of agricultural production was not the specific responsibility of the block development officer at the block level or the district collector at the district level; they were only responsible for coordination. Individual departmental officers were responsible for physical targets, in terms of inputs, and no one was responsible for the production target at the district or lower levels. In fact, such district level production targets were not even fixed. If there were shortfalls in any program in the block or district, there would always be a scapegoat.

To ensure smooth and effective implementation of agricultural development programs, there should be a designated development organization for placing responsibility for the achievement of targets on an individual officer. This officer should have not only the requisite power to call for an explanation of shortfalls but also the means to take remedial measures.

Agricultural development involves multidisciplinary efforts and, hence, participation by different departmental agencies. This requires coordination of the activities of different agencies at the appropriate level. It is well known that horizontal coordination is not effective, even more so in the hierarchical administrative setup in India. The only language and authority that are understood are directives and vertical lines of command. In other words, the coordinating authority, regardless of its level, cannot ensure that work is carried out unless the implementing agency is directly responsible to it. The block development officer cannot issue instructions to a credit officer belonging to another department, bank, or cooperative society to sanction credit for a particular individual for a specific purpose at a given time. The National Commission on Agriculture recommended the appointment of a chief agricultural development officer (CADO) at the district level and a block agricultural development officer (BADO) at the block level to be in charge of agricultural development programs at these levels (National Commission on Agriculture 1976, Part XIV). These officers were expected to be assisted by the planning, budget, and progress analysis unit at the district level and the progress unit at the block level. Yet, the commission envisaged only a coordinating role for them, which obviously is not enough. It is suggested that the responsibility for achieving targets should be fixed on these officers. Field organizations of the agricultural department should be reorganized into an agricultural development department headed by the CADO at the district level and BADO at the block level.[7]

With regard to discharging responsibility for schemes involving several departments, at the start of the season, after details of the schemes are worked out and sanctions issued, all officers concerned with implementation of the scheme should meet at the block or district level under the chairmanship of the BADO or CADO and draw up a plan of action with an agreed upon time schedule.[8] The actual implementation should be left to departmental agencies, which should promptly bring to the attention of the BADO/CADO any difficulty that they might

[7]Functions relating to social services at the block level, i.e., health and nutrition, education, drinking water, etc., may be separated from agricultural development functions, and the existing BADO may continue to be responsible for them with the assistance of two (of ten) village-level workers separately designated for these social services on a full-time basis. The remaining eight village-level workers should devote their full attention to agricultural programs.

[8]The expert group appointed by the Reserve Bank of India to review agricultural credit schemes of commercial banks made several recommendations for improving implementation procedures. These include the setting up of a task force at the district level to facilitate the implementation of location-specific and activity-oriented credit schemes (Reserve Bank of India 1978b).

have in adhering to the schedule so that remedial action can be taken immediately (or other linkage effects studied and appropriate action taken). Often, such difficulties are brought to light only at the time of postmortem examination when it is too late.

The next important step for ensuring effective implementation is to arrange for systematic monitoring and evaluation of the programs. The 1978–1983 draft Sixth Five-Year Plan refers to the steps to be taken for strengthening the planning, implementation, and monitoring organization and for induction of professional expertise at all levels (Planning Commission 1979a, p. 253). In view of its importance in the context of growth and equity, the monitoring organization for agricultural development should also be under the CADO, as proposed by the National Commission on Agriculture.

The attitude of implementation staff, with respect to reporting progress, should change. They either feel that these are "routine" reports to be sent up or there is a tendency for exaggerated reporting, misreporting, or nonreporting to obtain undeserved praise or cover up poor performance. Misreporting can be reduced through proper supervision and spot checks. The ex post program evaluation should, however, be carried out by independent agencies outside the implementing departments. A statutory obligation to submit evaluation reports to state legislatures and parliament will have a salutary effect on the timeliness of the reports and their accuracy.[9] The evaluation report should place particular emphasis on how well equity objectives are being realized and, if difficulties stand in the way, what measures are proposed to overcome them.

Some other important suggestions to ensure smooth implementation include: (1) Adapting financial rules to the particular needs of "time-bound" agricultural schemes. Often when a scheme is formulated, only a broad outline is drawn up; full operational details are not worked out because officials justifiably feel it to be infructuous until the scheme has been sanctioned and the necessary funds secured. To make matters worse, sanctions are often issued too late, leaving very little time to work out full details, and so implementation is rushed. If working out full operational details is insisted upon, one season may be lost, and the sanction may become void. This situation has to change. There should be provision for administrative approval of a scheme for the period of the plan subject to year-to-year provisions in the annual budgets. There should be built-in procedures for advance action for recruitment of personnel and placing orders for equipment and materials so that as soon as the budget is approved immediate action to fill posts and obtain supplies can be taken. Implementation delays in agricultural schemes are extremely costly, because a few weeks' delay may mean postponement for a whole season or even a year.

(2) Decentralization of power and delegation of authority contribute to speedier program implementation; but questions are raised regarding whether or not they are conducive to equity. If power is decentralized and fully delegated to lower-level officials, these officials may be pressured or influenced by politicians and vested interests. Because most of the equity-oriented programs run counter to the interests of the rural elite, their implementation may suffer. The remedy for this situation does not lie in not decentralizing power, but in providing safe-

[9]The panchayati raj institutions committee made a similar recommendation for presenting to the legislature an administrative report on panchayati raj institutions. They went a step further to suggest the establishment of a committee of the legislature to be especially concerned with the physical and financial performance of panchayati raj bodies.

guards, checks, and balances to guard against undue influence from vested interests.

(3) Another factor responsible for slow implementation of equity programs is the lack of commitment on the part of staff to the goal of equity and social justice. Some ascribe this to the fact that higher level officials generally have urban backgrounds and come from rich families that alone could have afforded their higher education. As brighter officials progress, officials at lower levels are either fresh recruits without adequate experience or mediocre. Also, government service implies a job with security and little or no punishment for nonperformance. If one exceeds authority and takes initiative, they may be reprimanded if an error is committed; whereas there is safety in working within existing rules and regulations. If implementation of equity programs is to be improved, these attitudes have to change. Some of these traits can be altered through training, but training alone is not sufficient. Provisions in government service regulations for incentives and rewards, on the one hand, and disincentives and punishments, on the other, should be amended.

People's Participation

The role of the people in agricultural planning and implementation merits a dispassionate consideration. Generally, agricultural development programs are largely amenable to local-level planning and the people's participation;[10] which can be at different stages, i.e., assessment of needs, formulation of schemes, and implementation of schemes.[11] Barring a few isolated instances, participation of farmers or their organiza ions in the formulation and implementation of agricultural programs has been neither effective nor fruitful. In farmers' organizations, the interests of small and large farmers differ. Formation of a militant trade union type organization for small farmers and landless labourers may not be in the broader interests of agricultural production because this would lead to class conflicts and social upheavals. Yet, if agricultural development is left to the operation of free-market forces, the interests of small farmers suffer. This suggests some sort of government intervention to safeguard the interests of the poor. In rural areas, political, economic, and social power go together; where they do not, conflicts arise, social tensions build up, and agricultural production suffers. The subject of farmers' organizations and participation, therefore, needs careful examination. What can be suggested is that after development programs are prepared at the block level they could be referred to any existing committees

[10]The panchayati raj institutions committee, recognizing the need for coordination of rural development programs at a decentralized level and noting that this function cannot be left only to official machinery, suggested that the panchayati raj system should fulfill the need for a locally elected organization to supervise, coordinate, and arrange feedback on these programs. However, panchayati raj institutions, as presently organized, are oriented toward vested interests and rich farmers in rural areas. The committee is aware of this and made recommendations to avoid it; but it is doubtful whether these drawbacks can be overcome in the foreseeable future. The working group also felt that, unless adequate safeguards are provided against the likelihood of the dominance of panchayati raj institutions by vested interests, giving them a decisive voice in the preparation of microlevel or grass-roots plans, one of its major objectives, i.e., removal of poverty, exploitation, and unemployment, will not have much chance of being realized.

[11]The working group has expressed the view that the correct stage to consult the people is not at the start of the planning process but after the broad framework of the plan is drawn up because, if they are asked to indicate their needs in a vacuum, they are bound to put forward a charter of demands that is far beyond the capacity of the government to fulfill.

where farmers are represented for their views. The best interests of equity would only be assured if small and marginal farmers and agricultural labourers are adequately represented on these committees and if their voice is, in fact, effective.

Under the community development program, village agricultural production councils or committees were set up but most of them languished for lack of interest. Farmers' organizations at the grass-roots level in India exist in name only. Some of these consist largely of self-styled leaders who do not have a base at the village level. Cooperative societies, even where they are active, are dominated by vested interests. The panchayati institutions have not, in most cases, shown any interest in agricultural production activities. In some countries, party cadres are actively associated with production programs. Even if such a system were to develop in India, it would be best to keep politics out of development. The National Commission on Agriculture recommended that farmers' organizations be set up at different levels as social counterparts of farmers' service societies, but this recommendation has not yet been implemented. Raj Krishna (1979) suggested the formation of a registered society of beneficiaries as a small farmers' association at the district level — a trade union of small farmers — to oversee the implementation of special development programs. Although implementation of agricultural development schemes could be enhanced by the real participation of a farmers' organization, such a body must develop naturally and truly reflect all farmers' interests. However, such organizations should not be promoted indiscriminately.

An argument is often advanced that unless the rural power structure, comprising rich landlords, or *kulaks*, traders, and moneylenders, is broken, equity programs cannot be successful because this group would find ways and means of obstructing their implementation, lower level implementation staff either being in collusion involved with it or under its influence. No concrete solution for dissolving this bureaucrat – rural elite nexus is at hand; unfortunately, it cannot merely be wished away or eliminated by issuing notification under duly enacted legislation. The radical redistribution of land sometimes suggested is not practicable for reasons discussed earlier. The process of educating the rural poor and organizing them is also time consuming. Economic status and assertion of rights often go together as do poverty and low social status. This vicious cycle of poverty leading to denial of social justice must be broken.

In this context, a recommendation made by the National Commission on Agriculture (1976, Part XII, p. 28) that small and marginal farmers be given adequate representation on the board of directors or managing committee of the farmers' service society deserves careful consideration. Although the possibility exists that these representatives of the "rural poor" might act under the influence of the vested interests, the managing director should, in such cases, safeguard the interests of the poor. If the managing director also joined the rural elite group, this would be revealed during the evaluation of the program and corrective action could then be taken. Thus, it is the role of the government to safeguard the interests of the weaker sections until such time that these groups become better organized and are capable of asserting their own rights.

9. Some Concluding Observations

The twin problems of rural poverty and unemployment are massive. Their solution lies primarily in the adoption of a strategy for comprehensive development of the agricultural sector, covering not only crop production but also associated subsidiary activities and rural industry specifically designed for achieving growth with equity. Conditions that favour such growth seem to exist in Indian agriculture. The seed–fertilizer technology is neutral to scale; scientific practices in animal husbandry and other subsectors can be adopted on a small scale; and demand for dairy and meat products is high. There are vast opportunities for exploiting yield potentials and faster growth rates are possible in these subsectors. Yet, target group oriented programs have not, by and large, succeeded because of defective planning procedures, ineffective implementation, and inadequate coverage. Wherever these programs have been implemented effectively, they have helped to improve the economic conditions of the weaker sections.

Financial resources need not be a constraint. The major programs requiring large investments are irrigation and infrastructure development. Plan resources for development of irrigation could be supplemented by institutional financing. These could be augmented by international multilateral and bilateral resources, particularly to finance minor irrigation works with a short gestation period, benefiting small farmers. Foreign exchange may be a constraint to the import of large quantities of fertilizers but this should be overcome by giving it higher priority and resorting to international financing facilities.

India has an experienced administration system, capable of handling rural development programs provided that certain deficiencies are remedied. The country has a large reservoir of educated manpower and many educational institutions that could be tapped to train the scientific, technical, and administrative personnel needed to adopt decentralized planning and implement equity programs.

It should be noted that the country is not starting from scratch. Many of the development experiences in India have been subjected to intensive study both from within the country and outside. Several of the policy decisions are based on careful analyses of the implications of the various alternatives open within the existing political framework. Most of the new equity programs have been evaluated and the directions in which improvements are necessary are known.

Because the problems are so vast, no visible improvement in conditions in rural areas is possible overnight, but it should be possible to reduce poverty and unemployment over the next 10–15 years if the policies and strategies suggested here are implemented. Although equity-oriented programs may be opposed by vested interests initially, there is a realization even among them that the weaker sections cannot be neglected for long. The number of people living below the poverty line is large and in a democratic setup with adult franchise they are bound to assert their rights sooner or later. It is, therefore, clear that continued

neglect of their interests, resulting in further deterioration in their living conditions, may lead to tensions, class conflicts, and violence. The strategies for improvement are available. The political will and commitment to social justice at the top has to percolate down to the village and block levels at which most of the programs become operational and where the poor people live.

India is a vast subcontinent, with agroclimatic conditions; technological, organizational, and socioeconomic factors; and infrastructure endowments varying from area to area. Some of the policy prescriptions for Punjab and Haryana may not hold for Bihar where there may be several constraints and barriers to the adoption of the new technology. These constraints need to be looked into on an individual basis. Only then can remedial measures be taken. In many cases, it is not a straightforward alternative of choosing one strategy or policy instrument and excluding another. Within a given framework of time and resources, a judicious mix of strategies and policy instruments may have to be adopted with clearly established priorities for achieving policy objectives. The interrelationships between various policy instruments have to be recognized and provided for. These instruments will have to work within the given sociopolitical framework. Frequent and violent changes are undesirable; policies and programs, therefore, should be flexible, with built-in provisions for review and modification.

Bibliography

Ahluwalia, M.S. 1977. Rural poverty and agricultural performance in India. Journal of Development Studies, 14, 298–323.

Alagh, Y.K. and Sharma, P.S. 1980. Growth of crop production: 1960/61 to 1978/79 — Is it decelerating? Indian Journal of Agricultural Economics, 35(2), 104–118.

Bachman, K.L. and Christensen, R.P. 1967. The economics of farm size. In Southworth, H.M. and Johnston, B.F., ed., Agricultural Development and Economic Growth. Ithaca, NY, Cornell University Press.

Bardhan, K. 1977. Rural employment, wages and labor markets in India: A survey of research. Economic and Political Weekly, 12(27).

Bardhan, P.K. 1970. Green revolution and agricultural laborers. Economic and Political Weekly, 5 (29–31).

1973a. Variations in agricultural wages: A note. Economic and Political Weekly, 8.

1973b. Size, productivity and returns to scale: An analysis of farm level data in Indian agriculture. Journal of Political Economy 1981, 1370–1386.

Bell, C.L.G. and Duloy, J.H. 1974. Rural target groups. In Chenery, H., Ahluwalia, M.S., Bell, C.L.G., Duloy, J.H., and Jolly, B., ed., Redistribution with Growth. London, England, Oxford University Press.

Benor, D. and Harrison, J.Q. 1977. Agricultural extension: The training and visit system. Washington, DC, World Bank.

Bhagawati, J.N. and Chakravarty, S. 1969. Contributions to Indian economic analysis — A survey. American Economic Review, 59, Part II.

Bhalla, G.S. and Alagh, Y.K. 1978. Spatial pattern of levels and growth of agricultural output in India. Delhi, India, Jawaharlal Nehru University. (Mimeo)

Bhalla, S. 1977. Agricultural growth: Role of institutional and infrastructural factors. Economic and Political Weekly, 12, 1898–1905.

Bhattacharya, N. and Saini, G. 1972. Farm size and productivity — A fresh look. Economic and Political Weekly, 7, A63–A72.

Binswanger, H.P. 1977. The economics of tractors in the Indian sub-continent: An analytical review. Hyderabad, India, International Crops Research Institute for the Semi-Arid Tropics.

Chenery, H., Ahluwalia, M.S., Bell, C.L.G., Duloy, J.H., and Jolly, B., ed. 1974. Redistribution with growth. London, England, Oxford University Press.

Clay, E.J. 1975. Equity and productivity effects of a package of technical innovations and changes in social institutions: Tubewells, tractors and high yielding varieties. Indian Journal of Agricultural Economics, 30(4), 74–87.

Cline, W.R. 1977. Policy instruments for rural income distribution. In Frank, C.R. and Webb, R.C., ed., Income Distribution and Growth in the Less Developed Countries. Washington, DC, The Brookings Institution.

Dandekar, V.M. and Rath, N. 1971. Poverty in India. Bombay, India, Indian School of Political Economy.

Dantwala, M.L. 1972. Preface. In Agricultural Development in Developing Countries in Asia and the Southeast — Comparative Experience: Papers and Proceedings of an International Seminar held at New Delhi, India. Bombay, India, Indian Society of Agricultural Economics.

1976. Agricultural policy in India since Independence. Indian Journal of Agricultural Economics, 31(4).

1978. Future of institutional reform and technological changes in Indian agricultural development. Economic and Political Weekly, 13, 1299–1306.

Department of Agriculture. 1946. Statement of agricultural and food policy in India. Delhi, India.

1957. Report of the Balwantray Mehta study team. Delhi, India.

Desai, B. M. 1979. Introduction. In Desai, B.M., ed., Intervention for Rural Development — Experiences of the Small Farmers' Development Agency. Ahmedabad, India, Indian Institute of Management.

Desai, G.M. and Singh, G. 1973. Growth of fertilizer use in districts of India, performance and policy implications. Ahmedabad, India, India Institute of Management.

Etienne, G. 1980. Some field observations in rural India's development. London, England, Overseas Development Institute, Agricultural Administration Network Papers No. 2.

Ford Foundation. 1959. India's food crisis and steps to meet it. Delhi, India, Report of the Agricultural Production Review Team.

Griffin, K. and James, J. 1979. Problems in transition to egalitarian development. The Manchester School, 248–269.

Hanson, A.H. 1966. The process of planning — A study of India's five-year plans, 1950–64. London, England, Oxford University Press.

Hicks, U. 1979. Thirty years of planning: The Indian experience. The Malayan Economic Review, 24(2).

International Labour Organisation (ILO). 1976. Employment, growth and basic needs. Geneva, Switzerland.

Johl, S.S. 1973. Farm size, economic efficiency and social justice: A case of Punjab. Agricultural Mechanization in Asia, No. 4, 56–61.

Jose, A.V. 1974. Trends in real wage rates of agricultural laborers. Economic and Political Weekly, 9, A25–A37.

Kanel, D. 1967. Size of farm and economic development. Indian Journal of Agricultural Economics, 22.

Khusro, A.M. 1964. Returns to scale in Indian agriculture. Indian Journal of Agricultural Economics, 19, 51–80.

1969. The economics of land reforms and farm size in India. Delhi, India, Institute of Economic Growth.

Lele, U. 1974. Roles of credit and marketing. In Nurul Islam, ed., Agricultural Policy in Developing Countries. New York, New York, Halstead Publications.

Lewis, J. P. 1977. Designing the public works mode of anti-poverty policy. In Frank, C.R., Jr and Webb, R.C., ed., Income Distribution and Growth in the Less Developed Countries. Washington, DC, The Brookings Institution.

Lipton, M. 1968. The theory of the optimizing peasant. Journal of Development Studies, 4(3), 327–351.

Lockwood, B., Mukherjee, P.K., and Shand, R.T. 1971. The high yielding varieties program in India. (Draft of Part I.) Planning Commission, Government of India and the Australian National University.

Mehra, S. 1976. Some aspects of labor use in Indian agriculture. Ithaca, NY, Cornell University Press, Occasional Paper No. 88.

1981. Instability in Indian agriculture in the context of the new technology. Washington, DC, International Food Policy Research Institute, Research Report 25.

Mellor, J.W. 1968. Developing rural India: Plan and practice. Ithaca, NY, Cornell University Press.

1976. The new economics of growth — A strategy for India and the developing world. Ithaca, NY, Cornell University Press.

Mellor, J. and Lele, U.J. 1973. Growth linkages of the new foodgrain technologies. Indian Journal of Agricultural Economics, 28(1).

Mettrick, H., Roy, S., and Thornton, D.S. 1978. Agricultural mechanization in South Asia. Development Research Digest, No. 2, 28–33.

Minhas, B.S. 1974. Rural poverty, land distribution and development strategy: Facts. In Srinivasan, T.N. and Bardhan, P.K., ed., Poverty and Income Distribution. Calcutta, India, Statistical Publishing Society.

Minhas, B.S. and Srinivasan, T.N. 1968. Food production trends and buffer stock policy. The Statesman, 14–15 November.

Ministry of Agriculture. 1958. Report of the agricultural administration committee. Delhi, India, Manager of Publications.

1963. Report of the working group on interdepartmental and institutional coordination for agricultural production. Delhi, India, Government of India Press.

1979a. Annual report of the Department of Agriculture, 1978/79. Delhi, India, Government of India Press.

1979b. Annual report of the Department of Rural Development, 1978/79. Delhi, India, Government of India Press.

Ministry of Agriculture and Irrigation. 1975. All-India report on agricultural census, 1970/71. New Delhi, India, Controller of Publications.

1980. All-India agricultural census, 1976/77. (Mimeo)

Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. 1978a. Indian agriculture in brief. 17th ed. New Delhi, India, Controller of Publications.

Ministry of Agriculture and Irrigation, Department of Rural Development. 1978b. Report of the committee on panchayati raj institutions. New Delhi, India, Government of India Press.

Ministry of Agriculture and Irrigation, Directorate of Economics and Statistics. 1980. Estimates of area and production of principal crops, 1978/79. Delhi, India, Controller of Publications.

Ministry of Finance, Department of Economic Affairs. 1978. Economic survey, 1977/78. Delhi, India, Controller of Publications.

Ministry of Food, Agriculture, Community Development and Cooperation. 1969. Modernizing Indian agriculture. Fourth report on the intensive agricultural district programs (1960–68). New Delhi, India, Manager of Publications.

Ministry of Home Affairs, Administrative Reforms Commission. 1968. Report on the machinery of the Government of India and its procedures of work. New Delhi, India, Manager of Publications.

1968. Report of the Administrative Reforms Commission. New Delhi, India, Manager of Publications.

Mitra, A. 1968. Bumper harvest has created dangerous illusions. The Statesman, 14–15 October.

Morawitz, D. 1977. Twenty-five years of economic development, 1950–75. Washington, DC, World Bank.

Narain, D. 1977. Growth of productivity in Indian agriculture. Indian Journal of Agricultural Economics, 32(1), 1–44.

Narain, D. and Roy, S. 1980. Impact of irrigation and labor availability on multiple cropping: A case study of India. Washington, DC, International Food Policy Research Institute, Research Report 20.

National Commission on Agriculture, Ministry of Agriculture and Irrigation. 1971a. Interim report on milk production through small and marginal farmers and agricultural laborers. Delhi, India, Government of India Press.

1971b. Interim report on credit services for small and marginal farmers and agricultural laborers. Delhi, India, Government of India Press.

1973a. Interim report on reorientation of programmes of small and marginal farmers and agricultural laborers development agencies. Delhi, India, Government of India Press.

1973b. Interim report on poultry, sheep and pig production through small and marginal farmers and agricultural laborers for supplementing their income. Delhi, India, Government of India Press.

1975. Interim report on agricultural price policy. Delhi, India, Government of India Press.

1976. Report of the National Commission on Agriculture. Part I — Review and progress; Part II — Policy and strategy; Part IV — Climate and agriculture; Part V — Resource development; Part VI — Crop production, sericulture, and apiculture; Part X — Inputs; Part XII — Supporting services and incentives; Part XIII — Rural employment and special area programs; Part XIV — Planning, statistics and administration; Part XV — Agrarian reforms. Delhi, India, Controller of Publications.

National Council of Applied Economic Research. 1974a. Fertilizer use on selected crops in India. New Delhi, India.

1974b. Credit requirements for agriculture. New Delhi, India.

National Sample Survey, Cabinet Secretariat. 1968. Tables with notes on some aspects of land holdings in rural areas. Report No. 144, 17th round. Delhi, India, Manager of Publications.

National Sample Survey Organization, Department of Statistics. 1976. Tables

of land holdings, all India. Report No. 215, 26th round. New Delhi, India, Controller of Publications.

1977. Fertilizer use in agricultural holdings. (Mimeo)

Parthasarathy, G. 1979. Land reform and the changing agrarian structure. In Shah, C.H., ed., Agricultural Development in India: Policy and Problems. Bombay, India, Orient Longmans Ltd.

Patnaik, U. 1975. Output and marketable surplus of agricultural products of cultivating groups, 1960–61. Economic and Political Weekly, 10(52).

Planning Commission. 1953. First Five-Year Plan — People's edition. Delhi, India, Publications Division.

1956. Second Five-Year Plan. Delhi, India, Manager of Publications.

1961. Third Five-Year Plan. Delhi, India, Manager of Publications.

1969. Fourth Five-Year Plan, 1969–74 (draft). Delhi, India, Manager of Publications.

1974. Fifth Five-Year Plan, 1974–79 (draft). Delhi, India, Controller of Publications.

1978. Report of the working group on block level planning. New Delhi, India, Government of India Press.

1979a. Draft Sixth Five-Year Plan, 1978–83 (revised). Delhi, India, Controller of Publications.

1979b. How and why SFDA fails to deliver the goods. Kurukshetra, 27, 4–8.

Prasad, H.P. 1972. Economic benefits in Kosi command area. Patna, India, A.N. Sinha Institute of Social Studies. (Mimeo)

Raj, Krishna. 1979. Small farmer development. Economic and Political Weekly, 14, 913–918.

Rao, C.H.H. 1966. Alternative explanations of the inverse relationship between farm size and output per acre in India. Indian Economic Review, 1.

1975. Technological change and distribution of gains in Indian agriculture. Delhi, India, Macmillan Company of India Ltd.

Rao, V.K.R.V. 1974. Growth and social justice in Asian agriculture: An exercise in policy formulation. Geneva, Switzerland, United Nations Research Institute for Social Development.

Reddy, V.Y. 1979. Multilevel planning in India. Delhi, India, Vikas Publishing House.

Reserve Bank of India. 1975. Small farmers development agencies (a field study) 1972–73. Bombay, India.

1976. Marginal farmers and agricultural laborers development agencies (a field study). Bombay, India.

1978a. Report of the review committee on regional banks. Bombay, India.

1978b. Report of the expert group on agricultural credit schemes of commercial banks. Bombay, India.

Roy, S. 1974. Effects of farm tractorization on productivity and labor employment on Punjab farms. Columbia, MO, University of Missouri. (Thesis)

Royal Commission on Agriculture. 1928. Report of the Royal Commission on Agriculture. London, England, His Majesty's Stationery Office.

Rudra, A. 1968a. Farm size and yield per hectare. Economic and Political Weekly, 3, 1041–1044.

1968b. More on returns to scale in Indian agriculture. Economic and Political Weekly, 3, A33–A38.

1978. Organization of agriculture for rural development: The Indian case. Cambridge Journal of Economics, 2, 381–406.

Sanderson, F.H. and Roy, S. 1979. Food trends and prospects in India. Washington, DC, The Brookings Institution.

Sarma, J.S. 1974. Agricultural policy in India. Indian Journal of Agricultural Economics, 29, 1–15.

1978. India — A drive towards self-sufficiency. American Journal of Agricultural Economics, 60(5), 859–864.

Sarma, J.S. and Roy, S. 1979. Behavior of foodgrain production and consumption in India, 1960–77. World Bank Staff Working Paper No. 339. Washington, DC, World Bank.

Schluter, M. and Mellor, J.W. 1972. New seed varieties and the small farm. Economic and Political Weekly, 7(13), A31–A38.

Sen, A.K. 1962. An aspect of Indian agriculture. The Economic Weekly, February, 243–246.

1964. Size of holding and productivity. The Economic Weekly, February.

1975. Employment, technology and development. Oxford, England, Oxford University Press.

Sen, S.R. 1967. Growth and instability in Indian agriculture. Agricultural Situation in India, January.

Shah, C.H. 1978. Small farmers: Policy and problems. Economic and Political Weekly, 13, 1771–1775.

Sidhu, S.S. 1974. Relative efficiency in wheat production in the Indian Punjab. American Economic Review, 64, 742–751.

Singh, I.J. 1979. Small farmers and the landless in South Asia. Washington, DC, World Bank.

Sivaraman, B. 1972. Scientific agriculture is neutral to scale — The fallacy and the remedy. Presented at the 26th Conference of the Indian Society of Agricultural Statistics, Kalyani, India.

Srinivasan, T.N. 1972. The green revolution or wheat revolution. In Dantwala, M.L., ed., Agricultural Development in Developing Countries — Comparative Experience. Bombay, India, Indian Society of Agricultural Economics.

1979. Trends in agriculture in India, 1949/50 to 1977/78. Economic and Political Weekly, 14, 1283–1294.

Thamarajakshi, R. and Rao, G.V.K. 1978. Some aspects of growth of Indian agriculture. Economic and Political Weekly, 13, A113–A118.

Vaidyanathan, A. 1977. Performance and prospects of crop production in India. Economic and Political Weekly, 12, 1355–1368.

Vyas, V. S. 1970. Tenancy in a dynamic setting. Economic and Political Weekly, 5(26), A73–A80.

1978. Planning for the micro-regions: Dharampur approach. Artha Vikas, 14(2).

1979a. Some aspects of structural change in Indian agriculture. Indian Journal of Agricultural Economics, 34.

1979b. The agricultural labor market — A synoptic view. In Shah, C.H., ed., Agricultural Development in India: Policy and Problems. New Delhi, India, Orient Longmans Ltd.

Vyas, V.S. and Mathai, G. 1978. Farm and nonfarm employment in rural areas. Economic and Political Weekly, 13, 333–347.

Weiner, M. 1978. Political evolution — Party bureaucracy and institutions. In Mellor, J.W., ed., India: A Rising Middle Power. Boulder, CO, Westview Press.

World Bank. 1978. Sector policy paper on agricultural credit. Washington, DC.

1980. World development indicators — Annex to world development report. Washington, DC.